

STANDARD TEXTILE FABRICS

PART I

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Serial 5882A-1

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Printed in U. S. A.

International Correspondence Schools

Scranton, Pennsylvania



International Correspondence Schools Canadian, Ltd.

Montreal, Canada

What This Text Covers . . .

You'll want to use this instruction text as a reference book after you have completed your studies. For that reason we have arranged the contents in the form of an alphabetical index. Each term is followed by one or several numbers. These are the numbers of the articles where the terms are explained.

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Standard Textile Fabrics

PART 1

Cotton and Linen Fabrics

Why Study Fabric Names?

1. Think, for a moment, of the path a fabric takes from the designer's sketchbook to the ultimate consumer. The designer has a new idea and begins to develop it. To get his design produced, he must confer with the supervisor of weaving, and perhaps with the dyer and finisher. When the cloth is ready to leave the mill, the sales agent must present it to the buyers representing clothiers and department stores. From the buyers, the cloth travels to the salesclerks and then, finally, to the consumer. In some cases, there are still more people involved, such as jobbers, converters, and so on.

Now, if all the persons involved in producing, merchandising, and buying textile fabrics have the same understanding of the terms they use, everything is likely to proceed smoothly. Unfortunately, people don't understand terms in the same way. Often, when two persons say "broadcloth," each has a different fabric in mind, and the confusion that results is unimaginable. Surely you can see that if you know the correct definitions for the terms used in connection with cloth, you will have a better chance to succeed—no matter which part of the trade you work in. We'll therefore take up the names of fabrics and see exactly how they are to be interpreted.

You can't possibly remember every detail about all types of fabrics. Consequently, we have arranged the fabric names

alphabetically so you can look them up quickly when you need them. Before the advent of man-made textile fibers, that is, prior to the twentieth century, fabrics were classified in the following groups, according to the fibers of which they are composed: 1) cotton and linen; 2) woolen and worsted; and 3) silk. Man-made fibers, such as rayon, acetate, and nylon, were later added to the third class of fibers.

Even today, this system of classification is still a convenient one. You must remember, however, that people are creatures of habit. Your bed sheets are woven from cotton, and your tablecloths may be made from nylon; yet you speak of them as linen. Similarly, you'll find tweeds that are made of yarns spun of blends—perhaps blends of rayon, Dacron, and Vicara. Yet you think of them as woolen. Therefore, some of the fabrics you'll find classed with cotton in this text and elsewhere may well be composed of other fibers. The classification simply implies that these fabrics were originally developed for the cotton trade or are usually made of cotton. Also, it generally implies that the fabrics have the characteristics normally associated with cotton goods.

Review of Fabric Terms

2. In the description of each fabric, you'll find terms used that you are presumed to know. The construction, or texture, may be given as, let's say, 90×60 . This means the cloth has 90 ends per inch and 60 picks per inch. Or perhaps the construction is given as 60-square, which is equivalent to 60×60 . For all fabrics listed as cotton fabrics, the yarn numbers (18s, 40s, 60s, and so on) are cotton yarn numbers.

You should review the texts on yarn calculations and or cloth calculations if you are in any doubt about a specific term. At the end of the text we'll review briefly the finishes commonly applied to cotton-type fabrics. So if you come across a term you can't place, make a note of it. Chances are you'll find it revealed under finishes.

In this text you'll also find references to the working properties, or the ease of manipulation, of the various fabrics. These properties of the cloth are of primary interest to the clothier, or in the case of goods sold for home sewing, to the consumer.

With the few explanations just given, and the knowledge you have already acquired, you are ready to study fabric terms.

Airplane Cloth

3. As the name implies, airplane cloth was originally developed to cover airplanes. It is still used on control surfaces and small aircraft, but because of its many desirable qualities, its chief uses today are for apparel and for industrial applications for which it was not originally intended.

Most airplane fabrics are woven from fine two-ply yarns, such as 2/60s, in warp and filling. The plain weave is used. The fabric is mercerized, and a water-repellent finish is applied. Textures range around 80-square or higher. The cloth normally comes in widths of 36, 42, and 60 in. (inches). It has a normal breaking strength of 75 lb per in. (pounds per inch) and weighs about 4 oz per sq yd (ounces per square yard).

For use on aircraft, the cloth is treated with dope, a solution made from a cellulose acetate base. Airplane cloth that is bleached, but not given the dope treatment, is used for shirting, especially for collars and cuffs. When piece-dyed, the fabric is used for children's snow suitings, for ski wear, and for uniform fabrics. Airplane cloth has very good working properties, launders well, and has excellent wear properties.

Bag Sheeting

4. Another fabric that began as an industrial fabric is bag sheeting. Originally, bag sheetings ranged from rather coarse fabrics up to fabrics having the texture of regular sheetings. Today, very fine fabrics, such as print cloths, are sometimes

used as bag fabrics. These are a bonus for the farmer's wife who uses such bags for home sewing. These fine fabrics, however, are not referred to as bag sheeting in the trade.

For regular bag sheeting, coarse cotton yarns, say from 12s to 18s, are used. Constructions range from 40-square to 60-square. Normal widths are 30 and 36 in., with a weight of $2\frac{1}{2}$ to 4 yd per lb. The cloth is used to make bag containers for feed, foodstuffs, fruit, grain, salt, sugar, vegetables, and so forth. Bleached bag sheeting is used as a substitute for towel- ing, or for other household purposes.

Balloon Cloth

5. Perhaps the finest of all industrial fabrics is balloon cloth. Made with the plain weave and with fine combed yarns, the fabric has the same breaking strength in warp and filling. Exact specifications vary, but balloon cloth is always very strong. The constructions normally range from 92×108 to 116×128 , while yarn numbers range from 60s to 100s. When vulcanized and produced according to Government specifications, the cloth is used for air cells in airships and barrage balloons; it may also be used as a covering for light airplanes and gliders. The balloon cloth just described should not be confused with the cloth used for the outer covering of balloons and airships, which is a heavy fabric made from ply yarns and with a basket weave.

Regular balloon cloth has many uses, ranging from artificial flowers to typewriter cambric; from printed, glazed chintz to oil-treated tent fabric. It may also be used for fine shirting and shorts. Fabrics of this type are easy to manipulate laundry well, and give excellent service.

Batiste

6. The word batiste has several meanings. When it is used to mean a cotton fabric, it normally refers to a soft, sheer cloth woven with the plain weave. Textures of cotton batiste

range around 88×80 . The cloth is mercerized and made of high-quality 50s yarn or yarn of even finer count.

Batiste comes in white, in prints, and in solid shades. The material is used for dress goods and underwear. Its use is limited, however, because of its softness. The cloth is light in weight, running 14 to 16 yd per lb. It is durable and launders very well.

Blankets

7. Some cotton blankets, such as blanket sheets, are made for purposes to which cotton is especially suited. Others, made either entirely or in part of cotton, are intended to take the place of more expensive wool or synthetic blankets. The blankets come in so many different weights and constructions that it is hard to generalize about them. Cotton blankets are usually made with a relatively fine warp and a coarse filling. The filling is given a long, dense nap on both sides of the fabric.

Contrary to what many people believe, the warmth of a blanket has little to do with the fiber content or the weight. The warmth depends mostly on the thickness of the blanket. However, because cotton fibers are short and lack the liveliness of wool, it is difficult to give a cotton blanket a really long nap that will not become pressed down. On the other hand, cotton blankets can be laundered easily and are relatively inexpensive.

Blanket sheets are quite similar in construction to the heavier types of flannelette. They are woven as wide as sheets and are used by many people as top covering in mild weather. regular cotton blankets are usually woven with the plain weave, but sometimes the $\frac{2}{2}$ twill or the filling reversible weave is used. A medium-weight cotton blanket may have a construction of 40×30 , with 20s warp and 5s filling. Coarse, crisp cotton, such as Chinese or Peruvian cotton, can be used to advantage for the filling. The blankets may be in plain

colors for home use, or in stripe and plaid patterns, often with fringes, for use as travel rugs.

Bird's Eye Linen

8. In spite of its name, bird's-eye linen usually is made of cotton. Also known as doobby-woven diaper cloth, fabrics of this type are made with small, diamond-shaped weaves. Textures range around 64×48 , with 28s warp and loosely twisted 15s filling. The soft twist and comparatively long floats of the filling cause the fabric to be very moisture absorbent.

Cotton honeycomb cloth is quite similar to bird's-eye linen in construction and in the uses to which it is put, but the weaves used for it are slightly different. As the name implies, the surface of this cloth resembles a fine honeycomb.

The width of bird's-eye fabrics ranges from 18 in. to 30 in., depending on the intended use. The yarns must be carefully prepared to remove any burs, shives, or other foreign particles that might irritate a tender skin. Starch, sizing, or other materials that hinder absorption should not be present in the finished cloth. Bird's-eye linen is usually bleached, but for some purposes it may be dyed in soft pastel shades. In fine constructions, and decorated by printing, bird's-eye fabrics may also be used for blouses and sun dresses. The material is not very easy to work because of the filling floats, but it is reasonably durable and launders well.

Book Cloth

9. The basic fabric for a book cloth may be coarse print goods or sheeting in the plain weave. The finished fabric may be plain or embossed, pyroxylin-treated or starch-and-clay filled. The cloth comes in a wide range of colors and qualities to meet the demands of bookbinders. Pyroxylin-treated fabrics are washable or waterproof and do not blister, chip, or peel. Starch-and-clay-filled fabrics, on the other hand, lose their color when rubbed with a damp cloth.

Broadcloth

10. The term broadcloth, while commonly used in connection with cotton goods, has very little real meaning. Originally it was used to differentiate fabrics woven on broad looms, say 36 in. and wider, from fabrics woven on narrower looms, say 22 or 26 in. wide. Today, the term usually refers to any fine cotton cloth, from 36 to 40 in. wide, suitable for men's shirts and women's dress goods.

Broadcloths made from single yarns, around 40s count, with constructions around 130×60 , are often called single broadcloths. Broadcloths made in similar construction, but from two-ply yarns, such as 2/80s, in warp and filling, are called ply broadcloths. Besides these, there are broadcloths made with two-ply warp and single filling; these are called semi-broadcloths.

Broadcloth in all its forms is considered a staple in the cotton trade. The fabrics may be white, dyed, or printed. Broadcloth is very strong and durable, and it launders well. The better grades are usually mercerized.

Buckram

11. An inexpensive way to stiffen parts of garments, such as lapels, is to put buckram between the lining and the facing cloth. Buckram is a sturdy, stiff, and boardy fabric. It is made from cotton yarns, sometimes with an admixture of hemp, linen, or coarse hair fibers.

Cheap grades of buckram may be made with the plain weave. Better grades, however, are ply fabrics, with 2 face ends for each backing end, and with 1 face pick for each back pick. A characteristic construction is 36×24 , with 22s yarn for the face warp and 12s for the backing warp and for face and back filling. A heavy glue sizing gives the fabric its characteristic stiffness. Buckram is also used in the millinery and suiting trades.

Butcher Linen

12. Originally a sturdy work cloth, butcher linen is today regarded as a fashion fabric. The cloth is made in the plain weave from heavy, slubby linen yarns. A typical construction is 30×24 , with 14-lea linen warp and 16-lea linen filling. The fabric is usually bleached. After bleaching, it is often dyed in cool pastel shades. Since linen is liable to wrinkle, crease resistant resin finishes are applied to advantage. Calendering is used to enhance the natural luster of the linen.

Butcher linen does not soil easily, it launders well, and it gives excellent wear. It is used for women's dresses and suits and, in smaller amounts, for men's sport shirts and summer jackets. This fabric is very popular, but it has a relatively high price. Consequently, many low-priced imitations of it are produced. Cheap Osnaburgs with a linen-like finish and coarse rayon fabrics with slubby filling, are among the many fabrics masquerading as butcher linen. While some of these imitations are reasonably useful fabrics, they should not be classed with real butcher linen, as is sometimes done by unscrupulous salespersons and ignorant consumers.

Calico

13. Inexpensive cotton print goods are often called calico after the town of Calicut, India, where the cloth was originally produced. Made with the plain weave, a characteristic calico construction is 60×50 , with 30s carded cotton yarn in warp and filling. The cloth is usually printed in small, two-color designs. The serviceability is fair, depending on the construction and on the fastness of the print colors used.

Cambric

14. Cambric, a plain-weave fabric, may be bleached or piece-dyed. Construction varies, but 30s hard-twist yarns are usually found in warp and filling. The poorer grades have a smooth, bright finish, made with sizing that washes out during

laundering. Cambric is used for handkerchief linen, children's dresses, slips, underwear, and nightgowns. It is light in weight and well suited for sewing work. Since it has good body and is well sized, it looks neat. Cambric launders well but must be starched if its appearance is to be preserved.

Chambray

15. Because of its many desirable properties, chambray is an ever-popular fabric. Typically, the cloth is made with the plain weave and with a solid-colored warp and a white filling. A characteristic construction is 72×56 , with a width of 30 to 40 in. Depending on the quality, 30s carded yarns or 40s combed yarns are commonly used.

The fabric is smooth and rather lustrous. Medium and heavy grades find use in men's work shirts, while lighter qualities are popular in women's and children's wear. Fancy chambray may show stripes, checks, or dobby designs on the background. Chambray is sturdy, easy to manipulate, and attractive. It wears very well and launders satisfactorily.

Cheesecloth

16. Thin and lightweight, cheesecloth is among the cheapest of cotton fabrics. It ranges in width from 25 to 55 in. When it is made 36 in. wide, it is often called tobacco cloth. Better grades of cheesecloth, often made of two-ply yarns, may be bleached and given firm starching; they are then known as scrim. Cheesecloth cut into narrow strips is often called gauze. Constructions of cheesecloth vary widely, ranging from 20×12 to 48×44 . Carded yarns, usually 30s warp and 40s filling, are used.

The low grades of cheesecloth were originally used for wrapping cheese; hence the name. Today, cheap cheesecloth is used for dustcloths. Better grades are used for fancy-dress costumes, experimental drapings, and cheap flag bunting. Gauze made from yarns free of burs, and often impregnated

with disinfectants, is used for medical bandages. Tobacco cloth is stretched over tobacco fields to diffuse the strong sunlight. Scrim is used for inexpensive curtains and for apparel.

Cord Fabrics

17. Not to be confused with corduroy, Bedford cord, and other special fabrics, cotton cord is simply a cotton suiting fabric with a characteristic corded appearance. The fabric is basically woven with the plain weave, but it is given a cord effect in the warp direction by using a rib weave.

Let's look at a typical cord construction, say 90×60 , and see how it is made: In the warp there are 6 ends of black 30s, running in plain-weave order. These are followed by 3 ends of white $2/40$ s, running parallel, to form the cord. This pattern is repeated across the width of the goods. The filling is white 35s, so that the cords stand out solid white.

Variations of this construction in different widths and colors are used.

Cord makes a neat-looking summer suiting for men's wear and women's wear. It tailors well, gives good wear, and can be laundered. The main disadvantage is that the fabric wrinkles easily. However, with the introduction of wrinkle-resistant synthetics in the yarns, and with the use of resin finishes on the fabric, the tendency to wrinkle can be reduced.

The name cord is also used to describe an industrial fabric used in the production of automobile tires. The cord fabric used in tires consists of a warp of heavy cable yarn held together by a few picks of filling. A characteristic construction is 20×3 . The warp may consist of $3/5/22$ s, that is 3 ends of $5/22$ s twisted together, while the filling may be single 20s. The cord fabric is encased in rubber and constitutes the carcass of the tire. In a four-ply tire, for instance, four layers of cord fabric are in the rubber casing. Today the cotton cord in tires has been largely replaced by synthetic fabrics, such as high-tenacity filament rayon or nylon.

Corduroy

18. Corduroy goes through frequently recurring cycles of great popularity. It is probably the most important of cotton pile fabrics. Corduroy is a filling-pile fabric, with lines of filling floats arranged lengthwise in the cloth. The floats are cut after weaving, and the loose ends are brushed into cords of pile, which give the fabric its characteristic appearance. The cords are technically called wales, and when they are narrow, the material is known as pin-wale corduroy.

Originally, corduroy was chiefly made in dull shades and used for work clothes. Today, in bright colors, and even with printed designs, it is much used for leisure clothes and children's play togs. A characteristic construction is 60×200 , with 2 30s warp and 16s filling. However, the constructions and weaves vary widely, depending on the weight and appearance of the cloth desired. A favorite width is 36 in., but narrower and wider widths are available.

Covert

19. Cotton covert is a sturdy fabric used mostly for work clothes; it should not be confused with woolen and worsted covert. The fabric is usually made with the $\frac{2}{1}$ twill. Cotton covert resembles denim in wearing qualities, but it has a characteristic mottled appearance, caused by using mock twist in the warp.

A characteristic cotton covert construction is 66×46 , with 12s mock-twist warp and 12s solid-colored filling. The filling yarn is dyed, usually in the same shade as the darker color of the mock twist in the warp. Cotton covert is normally used as it comes off the loom, that is, it is used with a clear finish and is not napped as woolen covert is.

Crash

20. Although originally a linen or part-linen fabric, crash today is usually made of cotton. There are two types—one

for toweling and another for dress goods. Crash for appare is lighter and more finely woven than toweling crash.

A characteristic crash for dress use has a construction of 48×36 , with tightly twisted 24s warp and slubby 10s filling. The fabric may be bleached, dyed solid, or made with wover stripes. Crash is calendered to give it a rather lustrous finish comparable with that of the original linen fabric. It wears well, launders easily, and is not difficult to manipulate. On the other hand, crash wrinkles easily and doesn't look very dressy. It is, however, a useful fabric where utility is more important than appearance.

Crepe

21. There are many different types of crepe. At this point we'll consider only those types normally made from cotton.

All crepes are lightweight fabrics with a characteristically irregular surface. The crepe effect can be produced by the yarn, by the weave, by a special finish, or by a combination of these factors. Cotton crepe normally comes in 36 to 40 in widths. A typical texture is 56×40 , with 36s warp and 20 filling. Many widely different constructions and yarns, however, can be used for cotton crepe fabrics.

Cotton crepe is often made with the plain weave and with tightly twisted single S-twist yarn in warp and filling. The cloth is woven much wider than the desired finished width and the twisted warps are allowed to contract during finishing. The yarns then tend to pucker, causing the crepe effect.

A slightly different crepe effect is made by using a warp in which 2 ends of S-twist alternate with 2 ends of Z-twist. Such crepe is often called warp crepe. Another method is to weave a plain warp with a crepe-yarn filling; the resultant fabric is called filling crepe. With still another method, the crepe is made with alternating ends and picks of S-twist and Z-twist. Since box looms were originally used to make this crepe, it is sometimes called box crepe.

A common way to make fine crepes is to alternate 2 S-twist with 2 Z-twist, or 4 S-twist with 4 Z-twist, in warp and filling. The resulting cloth is called balanced crepe, because it has the same yarn arrangement in warp and filling.

Crepe Effects

22. Crepe effects are not necessarily made by using yarns as just described. Small, broken, irregular weaves, called crepe weaves or granite weaves, may also be used. These weaves cause a crepe effect in the cloth even when ordinary yarns are used. Highly twisted yarns, however, enhance the effect.

Still other crepe-like effects are obtained in a fabric known as crinkle crepe. This fabric can be made by weaving the warp from two separate beams and alternating between 4 ends from one beam and 4 ends from the other beam. One of the beams is let off slowly, putting the yarn under tension, while the yarn from the other beam is let off loosely. This causes the cloth to pucker, creating the crinkle-crepe effect.

More commonly, crinkle crepe is made by applying a special finish to ordinary lightweight cotton cloth. Caustic soda solution is printed on the cloth in narrow stripes, alternating with untreated stripes. The caustic soda causes the yarn in the printed stripes to shrink. The untreated stripes will then pucker, causing the crinkle-crepe effect. The caustic soda may also be printed in small checks and other patterns, giving a variety of pucker effects. When the stripes in crinkle crepe are rather wide, the cloth is sometimes called plisse.

Crepe made with highly twisted yarn is fairly elastic, which makes it suitable for tightly fitted dresses for women. Crinkle crepe is cool, washes well, and requires little or no ironing. These features make it popular for sport shirts, summer dresses for children, and pajamas. Crepe is usually piece-dyed, but it can be produced with woven or printed patterns. Since crepe is produced in all types of fibers, it should be labeled according to the fibers it contains.

Crinoline

23. Every few years the fashion designers get tired of clinging, form-revealing dresses and feature full skirts or puffed sleeves. Crinoline is a stiff fabric that is used as a foundation to support these creations.

Originally, crinoline was made of yarn blends containing stiff horse hair or goat hair, and some of the cloth is still made that way. The cheaper qualities, however, simply consist of a coarse cotton cloth having a construction around 30-square, with 20s warp and filling. The fabric is very heavily starched to make it stiff. It is often calendered to make it look glossy. Crinoline may be used as lining in other fabrics or made into underskirts to support the outer garment.

Damask

24. Originally a linen fabric, table damask is often made from cotton today. The large weave patterns that characterize damask require jacquard attachments on the looms. Table damask is usually white. It is made with bleached, combed cotton, with bleached linen, or with blended yarns. The blended yarns may contain synthetic staple as well as cotton and linen, to accentuate the luster of the fabric.

The width of table damask varies between 54 and 90 in., depending on the width of the tablecloths to be made from it. A characteristic construction is about 72-square, with 26s cotton in warp and filling. The 5-harness satin weave is normally used. The pattern is formed by alternating warp-flush and filling-flush satin. For example, table damask may have a pattern of stylized leaves in warp-flush satin on a ground of filling-flush satin. In very fine damask constructions, a face and a back warp and the 7-harness satin weave may be used. The resulting fabric is called double damask.

Damask fabrics come in various colors and are made from many types of fibers and yarns. Heavier damasks are used

for upholstery and drapes; these fabrics vary so much in construction that no definite figures on them can be given.

Denim

25. For many years, denim was known as the work horse of all cotton fabrics. A typical denim is woven 28 in. wide with a 2_T left-hand twill weave and a 66×40 construction. Carded cotton yarns, in counts around 10s, dyed in a navy or indigo shade, form the warp. Natural white carded yarns, in counts around 16s, form the filling. The weight of sturdy denim is 8 or 9 oz per sq yd. The cloth is used for overalls and furniture covering. It may also be used for the so-called "blue jeans," though real jean cloth is much more tightly woven than denim. Regular denim washes well and wears well. Hence it is used wherever wear is important and appearance secondary.

In recent years denim has undergone a startling transformation. It has emerged as a popular fashion fabric for leisure wear and childrens' togs. Since durability is not so important for these purposes, finer yarns and lighter weights are used. Bright colors are substituted for the navy warp. Bleached white yarn or pastel-colored yarn is used for the filling. Stripes and print patterns can also be seen in the denim adaptations for informal apparel.

Diaper Cloth

26. Bird's-eye linen, as noted previously, is often used for diapers. More commonly used, however, is diaper cloth, a lightweight fabric woven with the plain weave. Diaper cloth, or diaper gauze, as it is sometimes called, is similar to cheesecloth, except that loosely twisted yarns are used for maximum absorbency and the construction of the cloth is made reasonably tight so that the cloth can withstand constant washing. The cotton, as in other diaper fabrics, must be free of impurities.

Diaper cloth is usually 36 to 40 in. wide. A characteristic texture is 44-square, with 28s carded cotton in warp and filling

Dimity

27. Dimity is a thin, sheer fabric similar to lawn. It is distinguished from lawn, however, by corded stripes or sometimes by corded check effects. Dimity may be white, dyed, or printed. It launders well and is popular for summer dresses, slips, and curtains. It may also be used for aprons, bedspreads, and underwear. Most dimities wear well, the durability of the cloth depending, of course, on its quality and construction. Dimity is easy to manipulate.

The basic weave of dimity is the plain weave. The characteristic cords are produced by letting several ends run parallel, that is, by putting two or three ends on the same harness or through the same heddle. Dimity is usually made 36 in. wide. A construction of 90×60 , with 60s warp and 80s filling, may be considered characteristic, although there is a wide range of quality. Combed yarns are used and the cloth is usually mercerized. Light starching and pressing complete the finish.

Dotted Swiss

28. It sometimes happens that a certain weave pattern is popular year after year, with the result that the name of the pattern becomes identified with a type of fabric. This has been the case with dotted Swiss. The original fabric, as made in Switzerland, is a sheer cloth with a crisp finish. Woven dots, made by a lappet warp, are the outstanding feature of the cloth. Dotted swiss is used for waistings, curtains, and summer dress goods. The dots in this material, if properly made, are not affected by washing and ironing. The fabric launders very well and gives good wear. However, the starch finish must be restored after washing unless a permanent resin-type finish is applied.

A good grade of dotted swiss, as commonly made today, may have a texture of 70×50 , with 60s combed cotton in warp and filling. The ground fabric is woven with the plain weave. The dots are made by introducing picks of very loose yarn, or roving, at regular intervals. The loose yarn is raised over 2 or 3 ends and then allowed to float on the back for about $\frac{1}{2}$ in., more or less, depending on the spacing wanted between dots. The floats on the back are sheared off during finishing. Dotted swiss is usually made 36 in. wide.

Cheap grades of dotted swiss are made from cheesecloth. The dots consist of little tufts of flock, or fly, which are impregnated with a suitable adhesive and pressed into the cloth during finishing. A starch finish gives the material the crisp feel that is characteristic of dotted swiss. The flock-dot method has the further advantage that the cloth can be piece-dyed and the white dots applied later. Unless the fabric is reasonably well constructed, and the flock dots applied with a suitable adhesive, the cheap grades of flock-dotted swiss do not share the good wear and laundering properties of the woven dotted swiss.

Drill

29. While it is one of the most common cotton fabrics, drill in its original form is seldom seen by the consumer. Drills are always woven in the gray. Some of the fabrics are used as they are for industrial purposes; others are converted to a variety of uses. Most drills are woven with the $\frac{2}{1}$ warp-flush twill, but the left-hand twill is also used. The width may vary between 26 and 60 in. Constructions, too, vary widely; but a construction of 70×40 , with 12s carded yarn in the warp and 15s carded yarn in the filling, may be considered characteristic.

In the industry, drill is commonly used as the base cloth for coated fabrics of various types. It is also used extensively for shoe linings. Piece-dyed, it is used for inexpensive cotton slacks. Made to Government specifications, and dyed in a sun-

tan shade, it is used for summer uniforms. When printed, stiffened by a starch finish, and pressed, it is used for mattress covers and slip covers. Drill dyed in dark shades, and calendered for a glossy finish, is used as a lining; such lining material is sometimes called silesia. In short, drill can be adapted for many different purposes.

Ducks, Naught

30. The fabrics classed as duck are the heavyweight champions of all cotton goods. Most ducks are too heavy and stiff for apparel; they are mainly industrial fabrics. While ducks vary widely in weight and construction, they are generally woven tightly in plain weave, and with heavy ply yarns. Let's look at some characteristic fabrics in the duck family.

Naught ducks are the heaviest of all ducks. The name is derived from the numbering system—1/0, 2/0, 3/0, and so forth—naught being another term for zero. The numbers indicate the weight above 18 oz of a running yard of cloth 22 in. wide. For example, a yard of No. 1/0 duck 22 in. wide weighs 19 oz; a yard of No. 5/0 duck 22 in. wide weighs 23 oz. Constructions vary, but a characteristic construction for No. 8/0 duck is 25×14 . The warp in this case is 8/7s, that is, 8 plies of 7s yarn, while the filling is 12/7s. Most naught ducks are made from 7s yarn, with 6 to 15 ends twisted together.

Ducks, Number

31. Number ducks, also called canvas or sail ducks, are the next heaviest group of ducks. Here also the numbers indicate the weight per running yard of 22-in. width, with reference to a weight of 18 oz. Thus, No. 1 duck weighs 18 oz, No. 2 duck weighs 17 oz, No. 3 duck weighs 16 oz, and so on. A characteristic construction for No. 6 duck is 36×26 , with 3/7s warp and 3/7s filling. Number ducks are made not only in the 22-in. width, but also in other widths ranging from 36 to 72 in. These wide number ducks are sometimes called harvester

ducks, because they are used for tarpaulins to cover farm machinery and crops.

Ducks similar to the wide number ducks, but made to Government specifications, are called army ducks. A characteristic army duck is 30 in. wide, weighs about 12 oz per yd, and has a construction of about 40×32 , with 3/12s yarn in warp and filling. Still other ducks, similar to the number ducks, are called after their specific uses: bag ducks, for mail bags; belt ducks, for conveyer belting; hose ducks, for fire hose; chafer fabrics, for automobile tires, and so on.

Ducks, Lightweight

32. Lightweight ducks are made for cloth shoes, or sneakers. A characteristic duck of this type has a 50×36 construction, with 2/16s warp and 2/20s filling.

Another class of ducks, known as flat ducks, is made from single yarns. These tightly woven fabrics are used for tents and for rain-resistant clothing. A characteristic flat duck has a construction of 76×30 , with 12s warp and 8s filling. Cheaper grades of flat ducks, sometimes called waste ducks, are made with coarse filling yarns spun from cotton waste. For instance, a waste duck may have a 60×24 construction with 16s warp and 3s filling.

Remember that the term duck covers a wide range of fabrics. It must be further classified to take on a definite meaning.

Faille

33. The name faille is used so loosely in connection with cotton goods that it has little definite meaning. In cotton dress goods, faille is simply a fabric simulating the silk fabric of that name. It may be made with fine warp and coarse, cylindrical, filling, somewhat on the order of a poplin with soft filling; or, it may be made in a rib weave, with plain order in the warp and two picks on each shed in the filling. Faille is given a glossy finish to imitate the luster of the original silk goods.

A heavy faille is often used for upholstery purposes. The warp of these fabrics consists of fine silk or synthetic filament yarns or of fine mercerized cotton. The filling consists of heavy two-ply cotton yarns.

Flannel, Lightweight

34. Flannels differ widely in weight and construction. Since many flannels are made of wool, cotton flannels should always be marked as such in order to avoid misleading the consumer. All types of flannel are characterized by soft-twist filling yarn which is brushed during the finishing operations to form a soft nap on the goods. Depending on the use for which it is intended, either one side only or both sides of the goods may be napped.

Lightweight cotton flannels made with the plain weave are often called flannelettes. Some persons call all cotton flannel flannelette, but this practice leads to confusion in the mind of the consumer. Fabric widths for flannelette vary, but a typical flannelette is about 40 in. wide and has a 44-square construction, with 22s warp and soft-twist 12s filling. The fabric may be woven in the gray and piece-dyed or printed before napping, or it may have stripes formed by colored yarns used in the warp. Low-priced flannelette is sometimes made by using short fibers, such as comber waste, in the filling. This is unsatisfactory from the consumer's point of view, because the short fibers are likely to pull out during wear and laundering leaving the fabric bare.

Garments made of flannelette feel soft, warm, and cuddly especially when the nap is on the inside. This makes the fabric a favorite for pajamas and nightgowns for winter wear. On the other hand, the soft fabric does not hold its shape, does not drape well, and has low wear resistance. Consequently, it is not particularly suitable for outer garments. Flannelette, if properly made, is fairly easy to manipulate and launders well.

Flannel, Medium-Weight

35. Medium-weight cotton flannel is sometimes called Canton flannel, after the Chinese city where it originated. It is usually made with a twill weave. The $\frac{2}{1}$ twill is particularly suitable for fabrics to be napped on the back, the $\frac{2}{2}$ twill for fabrics to be napped on both sides.

Textures for cotton flannel vary widely. In top grades, combed yarn is used for the warp. A construction of 74×44 , with 20s warp and 10s filling, and a width of 30 in., may be considered average. The fabric, of course, is much more substantial than flannelette. In plain colors, medium-weight flannel is used for warm inner linings, pocket lining in topcoats, and so on. In bright solid colors, checks or plaids, it is a favorite for sport shirts, and for linings in blue jeans and in windbreaker jackets for outdoor wear.

Some flannels have a particularly fine and dense nap on the face. In the finishing operation, the nap may be brushed carefully and sheared evenly, so that it covers the weave completely. Such a finish is called a doeskin or duvetyne finish. A fabric finished in this way is sometimes called doeskin, but this is not strictly correct.

Dustcloths and sport-shirt fabrics of cotton flannelette are sometimes dyed yellow or tan to resemble chamois leather. They should not, however, be labeled or called chamois, as this would be misleading.

Gabardine

36. Gabardine is made from a number of different fibers and in many different constructions. It is one of the most popular of all apparel fabrics. All gabardines are characterized by a steep twill line, caused by a construction that has many more ends than picks per inch. Fairly hard twisted yarns are used, so that the face of the fabric may be clear. This effect is often accentuated by singeing.

A cotton gabardine 36 in. wide, with a thread count of 100×50 and 18s yarn in warp and filling, may be considered average. Such a gabardine is suitable for washable slacks especially when given a wrinkle-resistant finish. For suits however, gabardines of fibers having greater wrinkle resistance and a smoother hand than cotton are generally preferred.

Tightly woven cotton gabardines with a water-repellent finish are often used for raincoats. A number of these gabardines, including some imported from England and Italy, are so tightly woven that they are almost waterproof even without a special finish; yet they are not clammy as airtight fabrics of rubber or plastic are. Gabardines handle well and launder easily. However, the special finishes may have to be restored after laundering.

Gingham

37. Cheerful and sturdy fabrics, gingham have long been among the housewife's favorites.

Regular gingham is made in stripes, checks, and plaids from yarns dyed in fast colors. It is woven with the plain weave, a typical construction being 66×54 . It is made from carded yarns, with 25s warp and 35s filling. A width of 32 in. and a weight of 6 yd per lb are about average. The exact construction varies widely, some ginghams being much coarser, and others much finer, than the average given.

Very fine ginghams, sometimes called madras ginghams or zephyr ginghams, are made from combed yarns. High constructions, such as 100×80 , with 50s yarn in warp and filling are found in these ginghams.

Cheap imitations of gingham are made by printing characteristic gingham patterns on print cloth. It is a deplorable practice to sell such prints as gingham, because it may undermine the good reputation of real gingham.

In general, ginghams give good wear and launder well. They should, however, be treated to control shrinkage. Gingham

hams are easy to manipulate, but with fabrics having wide stripes or large plaids, it is necessary to match the patterns. Coarse gingham are used for drapes, tablecloths, aprons, and smocks. Medium gingham are favorites for women's and children's wash dresses. Fine gingham are used for shirts, blouses, and summer dresses.

Jean

38. There is much confusion about the term jean. The name originally referred to the fabric but later was used to describe the popular pants made from the material. These pants had to be heavy and rugged for the use of cowboys and of men in other occupations in which clothing is exposed to great stress. Today the "blue jeans" made for women's wear and children's play clothes are actually made from lightweight denim or drill.

Real jean cloth has a very high texture, especially in the warp. A construction of 96×64 , with 22s high-twist warp and 30s low-twist filling, is characteristic. Woolen yarn made of reprocessed wool may be used as filling in heavyweight jean cloth for cold-weather use. The left-hand $\frac{2}{1}$ twill weave is normally used for jeans. The fabric is dyed in a dark color, usually navy. It doesn't matter if this color isn't fast; in fact, "faded blue" is often used in denim play togs to imitate the appearance of faded jeans.

Because of its construction, jean has a very hard face and a fairly soft back. The fabric, when properly constructed, is rather stiff and boardy; therefore, it will not drape well. It washes well and wears like iron. Jean is fairly easy to manipulate when used for the purposes for which it is intended.

Lawn

39. One of the most popular of sheer fabrics, lawn derives its name from Laon, France, where it was first made. Sheer fabrics are always popular for women's summer dresses and

blouses. They let the air through freely and are therefore cool. Furthermore, you can look right through a sheer lawn—an idea that is attractive to many attractive girls.

Lawn normally comes in widths of 30 to 45 in. A thread count of 72×60 , with 45s warp and 60s filling, may be considered typical for lawns made from carded yarns. Fine lawns are made from combed yarns in constructions around 100 square, with warp counts around 70s and filling counts around 90s. Spun synthetics are sometimes used instead of cotton.

To further accentuate the cool appearance of lawn, the fabric is starched crisply during finishing. Lawn is crisper than voile, but not as crisp as organdy, two sheers which we'll discuss later. The starch finish of lawn has to be renewed after washing, but except for this, lawn launders well. Lawn may be bleached white, dyed in cool-looking pastel shades or printed in various designs.

Lawn is easy to cut and sew. It is used not only for misses' and children's summer dresses, but also for lightweight pajamas, lingerie, ladies' handkerchiefs, scarves, curtains, and lamp shades. Lawn is a smart-looking fabric.

Madras

40. The fine fabric known as madras was originally made with a fine cotton warp and silk filling. Today, madras is made from long-staple cotton yarns, preferably combed yarns. However, spun synthetics may be used in the filling to make a fabric closely resembling the original madras. Yarn counts of 40s for warp and filling may be considered average, but $2/80$ s is used in the warp of the best grades. The cloth construction is around 70-square, and the width is 27 in. or more.

Madras for apparel is usually woven with a ground of plain weave. It is often decorated with fine stripes, cords, or small checks, which are usually accentuated by weaving the decoration ends on a satin basis. Bright shades are favored in madras apparel fabrics. Madras for curtains is woven with a

plain leno weave as a base. Large floral designs are inserted with jacquards. The floats of the decoration warp on the back of the fabric are clipped off during finishing. Madras is durable and launders well. Apparel madras is easy to manipulate. It is very popular for men's shirts and misses' blouses.

Marquissette

41. Perhaps the most popular of all curtain materials, marquissette is today made more commonly from synthetic filament yarns than from cotton. However, some housewives prefer the traditional cotton fabric.

Marquissette is a very thin, transparent fabric; yet it is sturdy, because it is woven with a leno, or doup, weave. A width of 36 in., and a construction of 52×34 , with $2/90$ s combed, mercerized yarn in warp and filling, may be used for a cotton marquissette of good quality. The fabric is bleached and sometimes dyed in pastel shades. Different leno weaves are used for variety. No further finish is needed for a good marquissette, because the fine ply yarns keep the fabric crisp. Cheaper marquissettes, made of single yarns, must be given a starch finish or they will become limp.

Marquissette is easy to manipulate. It is not only used for curtains, but also for "peekaboo" inserts in dresses, for overdresses, and for veils.

Monk's Cloth

42. Coarse fabrics were adopted by monks for their habits as a sign of the simple, unpretentious life. Yet today coarsely woven goods have a strong appeal to the sophisticated homemaker. They are often used for table covers, furniture covers, and drapes. One type of coarse fabric used in this way is called monk's cloth or abbot's cloth.

Monk's cloth is normally woven with regular or fancy basket weaves, though twill derivatives may sometimes be used. The cloth may be called basket cloth, after the American name for

the weaves used, or hopsacking, after the English term for the same weave. The constructions vary widely, depending on the weight and strength of fabric desired. A texture of 30-square, with 2/8s yarn in warp and filling, is characteristic. Widths vary, depending on the width of the hangings or table covers to be cut from the cloth. Monk's cloth is difficult to manipulate, because the loose ends and picks are liable to ravel at the seams.

Nainsook

43. In its construction and in the yarns used, nainsook is identical with lawn. Nainsook, however, is not given the starch finish that makes lawn a crisp fabric. The face of nainsook may be left soft, without any particular finish. Such cloth, called English nainsook, is suitable for lingerie and baby clothes. If a more lustrous appearance is desired, the face of nainsook may be calendered and even lightly starched. Cloth finished in this way, called French nainsook, is suitable for summer dresses and curtains. Nainsook lacks a full body because of its loose construction and soft finish. However, it is fairly easy to manipulate, launders well, and gives fairly good service. Better grades of nainsook are mercerized and wear very well.

Organdy

44. One of the most popular of the lightweight fabrics, organdy is a sheer, stiff, transparent, plain-weave cloth. Textures and widths vary. A characteristic organdy is 40 in. wide and has a thread count of 82×74 . The warp may be 80s and the filling 100s, though finer yarn numbers are often used. The yarns are combed and mercerized.

Organdy is always given a very stiff, crisp finish. Formerly, the finish was made from shellac and egg albumen, which dissolve in laundering. Today, permanent, resin-type finishes are standard for organdy. While organdy is often just bleached

white. it can also be dyed in cool pastel shades, printed in various ways, or watermarked. In addition, organdy may be woven with color designs or with dots like those in dotted swiss.

While organdy is a very attractive cloth, it is not considered practical for everyday wear. Even though the finish is permanent, the fabric has to be handled with great care during laundering and pressing. Also, it is rather expensive, because of the fine yarns used.

Osnaburg

45. Osnaburg, a low-grade cotton fabric, resembles bag sheeting to some degree. The name of the fabric comes from the German town of Osnabrück, where it originated. Fabric of this type that is made from new cotton is called clean Osnaburg. When the yarns used consist partly of cotton waste, it is called P.W. (part waste) Osnaburg. Grade B Osnaburgs are made from yarns in which unclean waste is used in the raw stock for the yarn. Because of the coarse, lumpy yarns used, Osnaburg somewhat resembles jute bagging. When scoured and bleached, it looks like low-quality linen made from tow. A normal construction for Osnaburg is 36×30 , with 7s warp and filling. The width varies widely, depending on the end use of the fabric.

Osnaburg in the gray is used for a variety of industrial purposes, such as for grain bags, for box-spring covering, and for the base fabric in linoleum and imitation leather. The better grades of Osnaburg are converted for household materials. After being bleached, and printed with a design, Osnaburg is known as cretonne. The lumpy, irregular texture makes cretonne an "interesting" fabric for interior decorating purposes. Also, Osnaburg may be bleached and embossed to simulate coarse linen. It can then be used for beachwear and for inexpensive slacks. Osnaburg in all its forms is easy to manipulate. It drapes reasonably well, but it is likely to become

baggy when used for apparel. In all, Osnaburg is a good value for the cost, for purposes where a stout fabric is desirable.

Oxford

46. A cotton fabric that looks as if it were woven with a basket weave, Oxford actually has a fine warp and a coarse filling. The basic weave is the plain weave, with the ends run two-as-one, that is, with every two ends in the warp run parallel. A characteristic texture is 76×38 , with 36s warp and 15s filling. Combed, mercerized yarns are used in the better grades, especially in the warp.

Oxford is used chiefly for sporty-looking dress shirts, particularly the type made with a button-down collar. The fabric feels much softer than broadcloth and is therefore popular with some persons, but it soils more easily and doesn't wear as well as other shirting fabrics. Solid colors or stripe formations are often used in the warp, for variety in styling. Oxford is fairly easy to manipulate, but seams must be carefully sewn or the loose weave may ravel. The fabric launders well, but it may have to be starched slightly to keep it from being too limp.

Piqué

47. Before we go into detail about piqué, you must understand one of the historical developments that vex one so often in the study of fabric names. You see, true piqué is a fabric that has cords in the filling direction. There are reasons why it is undesirable to have cords run in this direction. One reason is that in dress designing, fabrics with lengthwise cords are usually preferable because such cords add the illusion of greater height and slinness, which most people desire. Another reason is that fabrics with a greater number of picks per inch cost more to weave. Consequently, most of the "piqué" you see today has lengthwise cords. But, as you've already learned, a cloth with lengthwise cords is a Bedford

cord. So the somewhat confusing result is that fine Bedford cords today are called piqué.

The weave for a real piqué (one with cords in the filling direction) is rather complicated. It has two warps: a face warp and a backing warp, usually in the proportion of 2 ends of face to 1 end of back. It has three fillings: 1) a face filling, which forms the surface of the cords; 2) a cutting filling, which forms the grooves between the cords; and 3) a coarse stuffer filling, which is held between the backing warp and the face warp under the face filling, to accentuate the cords. An average construction is 100×160 , with 30s for the face warp, 2/30s for the back warp, 30s for face and cutting filling, and 10s for the stuffer.

The weave for a Bedford cord piqué is similar to that used for worsted Bedford cords, except that the construction is much finer and stuffer ends are used to accentuate the cords. A characteristic construction is 150×80 , with 40s warp, 20s stuffer, and 40s filling. Besides the Bedford cords, there are other piqué derivatives. For instance, there are fabrics in which the raised portions of the cloth are arranged to form small diamonds, somewhat like those in bird's-eye fabrics. However, a characteristic of all piqués is a fine face construction, raised in cords or welts which are separated by distinct cuts, or low places.

Piqué is easy to manipulate. It launders very well and is durable. Because of the fine construction and fancy weave, piqué is rather expensive. It enjoys frequently recurring cycles of popularity as a fashion fabric because it is dressy and smart-looking. Lower-cost imitations of piqué are made from plain-weave fabrics embossed to give a piqué-like effect.

Pongee

48. Originally made of silk, pongee is often made of cotton today. Cotton pongee is woven with the plain weave. It differs from most fabrics in that it has a lightweight warp and

a heavy filling. A texture of 70×100 , with 60s warp and 40 filling, may be considered typical. Uneven yarns in natural color are often used in the filling, to further enhance the filling effect. In finishing, the cloth is calendered to give it a glossy silklike luster.

Pongee is easy to manipulate and launders well. It is durable and doesn't soil easily. The fabric is used for shirting blouses, slips, casual summer dresses, smocks, and office coats.

Poplin

49. In some respects poplin resembles broadcloth. One point of resemblance is that it is woven with the plain weave. Poplin, however, has fewer picks per inch than broadcloth and a heavier yarn is used for the filling. Some of the terms used to describe poplin are the same as those used to describe broadcloth. For example, you may hear the terms ply poplin, semi-poplin, and single poplin, the description depending on the yarns used. Lightweight single poplin is sometimes called poplinette. In all types of poplin, the heavy filling yarn should be even and cylindrical. This results in fine crosswise ribs which are the characteristic difference between poplin and broadcloth. Constructions vary widely, but a thread count of 100×40 , with 40s warp and 20s filling, makes a characteristic poplin. Widths vary, those between 30 and 36 in. being the most common.

Poplin is usually mercerized and then chased for a lustrous appearance. The cloth may be bleached, dyed, or printed. Heavy poplins for outerwear are often waterproofed. Due to the heavy filling, poplin can also be given a suede finish, but this changes the normal characteristics of the fabric. Poplin is easy to work with, resists soiling, and wears well. It is used for blouses, gowns, robes, shirts, children's suits, rainwear, and draperies. The heavier weights of this strong, rugged cloth are often used as uniform fabric; for instance, windbreaker jackets are often made of poplin with a flannel lining.

Print Goods, Regular

50. Modern printing techniques make it possible to print almost any fabric, even fabrics with uneven surfaces, such as corduroy. However, only the fabrics especially suitable for printing are generally called print goods. Cotton print goods are mostly woven with the plain weave and in light to medium weights. A characteristic print goods construction is 64-square, with 30s warp and 40s filling. Common widths are 30, 36, and 40 in.

Of course, print goods come in different constructions and widths. In weight and construction they may be almost as light as cheesecloth, as fine as lawn or organdy, as tightly woven as broadcloth, as sturdy as sheeting. However, when the construction is too far different from the average print-goods construction, it pays to be specific. It is unfair to the reputation of print goods to give their name to printed cheesecloth. On the other hand, it pays to advertise printed percale as such, because the definition will explain the higher price. Now, let's consider some specific types of print goods.

A characteristic print cloth, such as one with the construction given at the beginning of this article, may be called muslin. Originally, muslin was a fabric imported from the Oriental town of Mosul in Mesopotamia. Today the term muslin, when applied to print goods, means a fairly sturdy fabric made with the plain weave from carded cotton yarns. Print goods based on muslin cloth are suitable for many uses, from dresses to decorative fabrics. The fabric is easy to manipulate, wears satisfactorily, and launders well, provided the prints are washfast. Starch finishes, when used, must be restored after washing.

Print Goods, Percale and Chintz

51. Fine print cloth is often called percale. This was originally a trade name for sheeting made from combed yarns, but today the name is used to describe any fine cloth of medium

weight that is woven with the plain weave. A typical percale print cloth texture is 80-square, with combed 40s warp and combed 50s filling. Cloth similar to this in construction, but woven with finer yarns and lighter in weight, is called percaline. Starch and calendering are used to give percaline a slightly stiff, very glossy appearance. The starch finish, and also the chased and beetled finishes sometimes applied to percaline, may disappear in laundering. Fine percaline is sometimes called cotton taffeta because it resembles the rayon fabric of that name.

While percale is finer than regular print goods, chintz is usually coarser. Originally the name of a linen fabric, the term chintz is now generally used to describe medium to coarse print goods that are heavily starched and given a glossy finish. Constructions vary, but 60-square with highly twisted 25s warp and loosely twisted 30s filling is an average construction for chintz. However, Osnaburg is often converted into inexpensive chintz. The glossy finish, when produced with starch or wax, is removed in laundering. But chintz can also be given a resin finish that is permanent.

Chintz has long been used widely for curtains and slipcovers. With the permanent finish it can also be used for dresses. Chintz is sometimes confused with cretonne, which is understandable: cretonne is a coarse chintz without the characteristic glossy finish; if you apply starch to a cretonne and calender the cloth, you obtain chintz.

Remember that practically any fabric can be printed today. Except for the regular muslin print goods, a further definition should be provided to describe a printed fabric.

Rep

52. Rep is sometimes confused with poplin because it, too, is woven with the plain weave and usually has a rib effect in the filling direction. True rep, however, differs from poplin in that only every second pick is heavy. For instance, a re

for shirting may have a thread count of 100×40 , with 40s warp and alternating picks of 40s and 10s in the filling. Reps for upholstery are much coarser. A characteristic construction for these reps is 80×20 , with $2/30$ s warp and alternating picks of 15s and 4s.

Variations are made by alternating coarse and fine yarns in the warp as well as in the filling. Different effects may be produced by running alternating ends from two beams, with one end slack, the next end tight, the next slack, and so on. In properties and uses, rep resembles poplin, but generally speaking, poplin is the more popular for apparel, while rep is the more popular for upholstery purposes.

Sateen. Warp and Filling

53. The only difference between satin and sateen is that satin is made from silk or synthetic filament yarns, while sateen is made from cotton or spun synthetics. Various satin weaves may be used in making sateen, but the 5-harness warp-flush satin weave is by far the most common. Many different constructions are used. We'll look at a few typical sateens, to give you a general idea of their characteristics.

The most common use for sateen is in linings for coats. It is made in various widths, 30 and 36 in. being the most common for apparel, and 54 in. the most common for industrial uses. A typical texture for warp-flush lining sateen is 110×60 , with 24s carded yarn in warp and filling. For filling-flush lining sateen a construction of 70×120 , with 30s warp and 40s filling, may be considered average. The fabrics are usually starched and calendered or schreinerized to obtain a glossy finish. Sometimes, twill linings that are given a glossy finish are called sateen, satine, or satinet, but these terms are misrepresentations.

Sateen. Fine and Special Varieties

54. Fine sateens for dress goods, and sleeve linings are made from combed, mercerized yarns. A thread count of

140×90, with 60s warp and 80s filling, could be used for such a sateen. Fine sateens are not used as much as formerly, since rayon satin fills the place formerly occupied by them. Fine heavy sateens, made with the 8-harness satin weave, are called Venetian. They are used for high-grade linings.

Heavy sateens are used for outerwear such as windbreaker jackets and ski suits. In construction, finish, and uses, these sateens are quite similar to sheen gabardine, but normally they are slightly heavier.

Sateen tickings are used for pillow covers and similar articles. They are heavier than lining sateens, a typical construction being 100×50, with 12s warp and 20s filling. The ticking cloth is often piece-dyed or made with warpwise stripes, and it is usually given a starch filling.

Satin-stripe shirtings are made by alternating stripes of plain weave with stripes of satin weave. The basic construction is similar to that of broadcloth. However, finer yarns, set tighter in the reed, are often used in the satin stripes.

All properly constructed sateen fabrics are easy to manipulate. A good sateen will also wear very well. However, this is not true of sateens that do not have enough ends and picks per inch to make the weave tight. Such improperly constructed sateens are sleazy; in articles made of these fabrics the seams are liable to ravel, and the fabric quickly wears out. Tightly woven sateens may present some difficulty in laundering, since the fabric is not easily penetrated by moisture. Starch and nonpermanent waterproofing must be restored after laundering.

Seersucker

55. A favorite for summer suits and slacks, seersucker is a heavy type of crinkle crepe, with narrow stripes and characteristic coloring. As in crinkle crepe, the puckered effect can be produced either by weaving alternate stripes from two different beams or by printing the stripes with caustic soda.

Usually the narrow stripes in seersucker are arranged by alternating white and colored ends in the warp—as, for example, 8 white, 8 colored, 8 white, and so on. The filling is solid white, as a rule. In woven seersucker the white ends are run from a beam at slack tension so they will pucker. The effect may be accentuated by running the white ends two-as-one, as in weaving Oxford. In printing seersucker, the caustic soda and the color of the colored stripes may be applied in one operation to plain white goods, provided the dyestuff used is compatible with caustic soda.

A good seersucker construction is 100×60 , with 30s yarn in warp and filling. In woven seersucker, finer yarn may be used in the colored stripes than in the white stripes. Seersucker is easy to manipulate, wears very well, and launders easily. It needs little ironing—just enough to restore the pleats in garments. Besides being used for apparel, this versatile fabric is used for slip covers and bedspreads.

Sheeting Muslin

56. As the name implies, sheeting was a name originally applied only to plain-weave cotton fabrics used for bed sheets. Today the term is used more loosely. By width, you can classify sheetings into those that are made for the use of converters, which are usually about 40 in. wide, and those that are made for bed sheets, which are usually wider. Those made for the use of converters should have the same construction as bed sheets, but they may simply be regular print goods going by a different name.

Sheetings for bed sheets should be heavier than regular print goods. The width is often given in quarters of a yard. Thus, a $\frac{3}{4}$ sheeting is 72 in. wide; a $\frac{2}{4}$ sheeting, 63 in wide, a $\frac{1}{4}$ sheeting, 90 in. wide, and so on. The coarsest muslin sheetings border on bag sheeting. The specifications for muslin sheeting vary widely. However, 64-square, with 20s warp and filling, is a characteristic construction for muslin sheeting.

To the consumer it doesn't matter too much, from a utility point of view, whether the thread count is a little lower and the yarn coarser, or the thread count is a little higher and the yarn finer. But, unfortunately, some manufacturers who turn out inferior sheeting give only partial information on the yarn count and thread count in order to mislead the consumer. There are two types of sheeting always to check well:

1) The "bargain" muslin sheeting. This is made with regular yarn numbers but a low thread count. Starch is used to give an appearance of weight and body. After one laundering you have a sleazy cloth, and after a few more launderings the "bargain" sheeting is worn out.

2) The "fine-count" muslin, often called "utility percale" to mislead the public. There is nothing wrong with using fine yarns if the thread count is increased in proportion. But in some sheetings the thread count is kept, say, at 64-square, with 40s yarn count. In other words, the construction is similar to that of a lightweight print cloth. A glossy finish is added with starch and calendering. After one washing the "percale" finish is gone and the "utility" of the fabric is far inferior to that of muslin.

To summarize: Muslin sheetings are sturdy fabrics that launder well and give good service. Starch and calendering may be used to add sales appeal but should not be substituted for quality and body.

Sheeting, Percale

57. Modern living demands a sheeting that is lighter, smoother, and more luxurious than muslin sheeting. The answer is percale. The term percale was originally a trade name, but it is used today to describe any fine sheeting made from combed yarns. A percale with a thread count of 100×80 made from 40s combed yarn in warp and filling, may be considered normal. Such a percale, while lighter in weight than muslin, will wear just as well. The lighter weight will pay

off in laundering, especially if laundering costs are paid by the pound. And, of course, the smooth, luxurious hand of good percale is attractive to the user. For these reasons, percale sheets have replaced muslin sheets in many homes and hotels, even though they are more expensive than muslin sheets.

Percale used for apparel purposes is quite similar to single broadcloth. The only difference is that percale usually comes close to a square construction while broadcloth normally has many more ends than picks per inch. Percale can be bleached, dyed, and printed, to meet the demands of fashion.

Suede and Similar Fabrics

58. The name suede cloth is somewhat vague, because suede is really the name of a finish, rather than a fabric. Originally, this finish was applied to tightly knitted fabrics used for making gloves, to imitate the smooth appearance and soft feel of suede leather. Today, suede finishes are given to various cotton fabrics to be used for linings, sport shirts, and dust-cloths. A suede finish is applied by abrading the surface of a fabric with an emery-covered roller. The process somewhat resembles the napping of flannel, except that the suede nap is much shorter and denser. As to the construction of the fabric, practically any cloth with a soft filling can be given a suede finish. The same constructions as for flannel, or somewhat finer constructions, are commonly used for suede.

A variety of luxurious suede cloth, called duvetyne, is sometimes used for woman's wear and millinery purposes. This cloth, which is woven with a filling-flush satin weave, was originally made with a cotton warp and a spun-silk filling; but today it is made with a cotton warp and a spun-rayon or synthetic filling, or it is made entirely of cotton. A characteristic duvetyne texture is 70×150 , with 2/60s warp and 25s filling. Since practically the entire surface of the cloth is formed by the soft filling, it can be given an extremely dense suede finish, resembling that of fine velvet.

Somewhat similar to duvetyne, but with a longer, coarser nap, is moleskin. This cloth is usually napped like flannel and then given a suede finish to make the nap denser and softer. The cloth is used for linings; so the nap is applied to the back. It is woven with a filling-backed weave, usually at a ratio of one face pick to two backing picks. A typical construction is 50×200 , with 2/20s warp and 15s filling.

Soft, warm fabrics like duvetyne and moleskin are not as popular today as in former years. The trend is to lighter fabrics. However, they are still used for special purposes and for variety.

Terry Cloth

59. First used in terry towels, or Turkish towels, terry cloth has many uses today. It has been adapted to all types of beachwear and also to sports shirts. The terry cloth used for apparel is usually finer, and lighter in weight, than terry toweling.

Terry cloth is a warp-pile weave, woven on special looms. Regular, or single-loop, terry cloth has alternating ends of ground warp and pile warp. The ground ends interlace with the filling in a regular manner. The pile ends are run from a separate beam under low tension. A special reed motion causes these pile ends to form a loop after each third pick. The loops are usually formed alternately on the face and the back of the fabric. However, the order can be changed to form designs, and fancy terry cloth can be woven with jacquards.

Constructions for terry cloth vary, depending on the weight and density desired. A normal terry construction for apparel use is 64×34 , with 16s cotton warp and filling. Frequently, the pile-warp yarn is more loosely twisted than the ground-warp yarn, to obtain greater absorbency.

A variation of terry cloth is called double-loop terry cloth. In this fabric, two ends of pile are used for every end of

ground warp. You can readily understand why in comparable constructions a double-pile terry fabric has a denser pile, but is correspondingly weaker, than a single-pile terry fabric. In general, the double-pile construction is undesirable. The consumer, misled by the dense surface and the attractive "double-pile" label, thinks she is getting a bargain. Disappointment follows when the cloth does not wear as well as expected.

Terry cloth is somewhat difficult to manipulate, because the seams are liable to be bulky. Care must be exercised in wearing it, because the loops of the pile pull out into long loops when they are snagged. On the other hand, the fabric soaks up moisture and perspiration rapidly. Thus it is ideal for robes and shirts for beach use and for sportswear. It can be bleached, piece-dyed, and even printed. The fabric launders well and needs no ironing.

Ticking

60. There are a number of different types of tickings, the characteristics of any type depending on the purpose for which it is made and the quality wanted. Most tickings are twill fabrics decorated with yarn-dyed stripes. They are normally used as they come off the loom without further finishing.

The coarsest tickings are called straw tickings because they were developed as covers for the old-time straw-filled mattresses. They are made with the $\frac{2}{1}$ twill. A characteristic construction is 64×50 , with 12s warp and 14s filling. Regular tickings, which are somewhat heavier, are woven with the $\frac{2}{2}$ twill. A characteristic construction for these tickings is 80×60 , with 12s warp and 16s filling. The finest tickings, called sateen tickings, are made with the 5-harness warp-flush satin weave. The construction is around 100×50 , with 14s warp and 20s filling. The major use for ticking is in mattress and furniture covers, but they are also used as backing for rubberized materials.

Certain plain-weave materials are sometimes classed with tickings and have similar uses. Nankin tickings are made with unbleached yarn in the warp and a solid-colored filling. A typical thread count is 80-square, with 22s warp and filling. Another variation is the awning stripes. These are fabric with wide, bright warp stripes; they are used for awnings, deck chairs, and the like. They may be in the construction and weaves used for tickings, or they may be in the plain weave. When made in the plain weave, constructions like those of lightweight duck or flat duck are used for awning stripes. Ticking stripes and awning stripes are sometimes printed on drill or duck fabrics, to imitate the appearance of tickings.

Toweling

61. Terry towels are the most popular and absorbent of a towels. They are made from terry cloth, which you have already read about. The heavier weights of terry cloth are used for towels of good quality. For instance, a construction of 60×30 , with $2/20$ s warp and 10s filling, makes a good terry towel. Still heavier constructions are used for bath mats. Bars without pile, called plain tabs, are often used for decorative purposes near the ends of a terry towel. Colored filling may be used to set off the plain tabs. Unless care is taken in weaving, however, the plain tabs are liable to contract more than the body of the towel, distorting the towel and causing consumer dissatisfaction.

Inexpensive towels are made of crash. This material is made in the plain weave, either from cotton yarns or from blends of cotton with linen tow. Toweling crash is somewhat heavier than the crash used for apparel. An average construction is about 40×36 , with 15s warp and 8s filling. Irregular yarn may be used in the filling to enhance the linenlike appearance. Crash towels wear well, but their water absorbency is not too satisfactory.

Huckaback, or huck, towels have a pebbled surface caused by the weave. Like crash towels, huck towels are often made of cotton-linen blends. However, huck towels of equivalent quality are more absorbent because they are made with granite or diamond weaves that allow yarn floats. A common huckaback texture is 60×40 , with 16s warp and 10s filling.

Glass towels are the aristocrats of kitchen towels. They are made of linen or of long-staple cotton yarns. After being carefully combed to remove all lint, the yarns are spun with high twist and are then singed to remove protruding fibers. Linen, or part-linen, glass towels are usually made with the plain weave and decorated with colored strips or checks. Cotton glass towels are sometimes woven with granite or crepe weaves, which makes them more absorbent but reduces the wearing qualities. The construction of a good glass toweling is around 60×40 , with 20s warp and 15s filling.

In general, as far as towels are concerned, the consumer wants good absorbency and long wear at a reasonably low cost. Unfortunately, it is difficult to balance these qualities in one fabric. A loose weave is more absorbent, but a tight weave wears longer. Linen is more absorbent and wears better, but it costs more than cotton. So the selection of suitable towels requires careful evaluation.

Velveteen

62. Although made originally to simulate silk velvet, cotton velveteen is a distinctly different fabric. While velvet is made with a warp pile, velveteen is made with a filling pile. Various weaves and constructions are used for velveteen, but a common arrangement is three pile picks to each ground pick, and a typical construction is 80×400 , with 40s warp and 50s filling.

Velveteen is strong and durable. It can be mercerized and is usually dyed in solid shades. The loops of the pile picks are cut after weaving and brushed to form a dense pile. The

fabric tailors well and is washable. It is used for women's and children's dresses and for linings, drapes, and hats.

Voile

63. One of the finest of cotton sheers, voile has lost some of its popularity to the sheer synthetic fabrics. Voile, like broad cloth, may be classed as single, semi-, or ply voile, according to the yarns used. A characteristic single voile has a thread count of 60×56 , with 50s warp and filling. A ply voile would be quite similar, but would be made with 2/100s yarn. For all voiles the yarns are tightly twisted, gassed, and mercerized. This treatment preserves the sheer appearance of the fabric and gives it a satisfactory hand and good drape.

Voile is made in various fancy varieties. Seed voile is made by using nep yarns in the filling. Shadow stripes are made by spacing the ends that form the stripe closely in the reed. Splash voiles are made with slub yarns. Piqué voile is made with parallel ends, or parallel ends and picks, in much the same way as dimity is made. All types of dyeing and printing including flock printing, may be applied to voile.

Voile wears and launders well. Since the characteristics of the cloth are caused by the yarn and the construction, rather than by the finish, it needs only pressing after laundering. Like other sheers, voile is somewhat difficult to manipulate. It is used for dress goods, blouses, children's and doll's clothes, scarves, drapes, and lamp shades.

Wigan

64. Neither the textile manufacturer nor the ultimate consumer normally sees anything of wigan. Named after the English village of the same name, the cloth is produced by the converter from lightweight sheeting or inexpensive print cloth. It is used by the clothier as interlining in men's wear and boys' clothing, at points where stiffness and substance are desirable in the garments.

The cloth for wigan is dyed in a dull, dark shade, such as black, gray, or brown. The dye should be fast so it will not bleed in dry cleaning. The cloth is then heavily starched and calendered, to make it stiff.

Finishes and Trade Names

Why Are Fabrics Finished?

65. Some fabrics are satisfactory to the consumer in the form in which they leave the loom; such fabrics are said to be loom-finished. Most fabrics, however, require some sort of finish after they leave the loom. Basically there are two reasons for finishing: 1) to improve the appearance of the goods and 2) to give the fabric desirable properties. These two aims may be opposed to each other. For instance, bleaching makes a cotton fabric look nice and white, but it weakens the fibers somewhat and often reduces the wear resistance. Then again, the two aims may be compatible. For instance, mercerizing not only adds luster to the goods but also strengthens the fabric.

Well into the twentieth century, comparatively little thought was given to cotton finishing. Did the goods shrink when washed? Let the customer beware! Did a cotton suit look as if it had been slept in after a few hours wear? Too bad! Cotton was king. No other fiber was as cheap, as plentiful, and as strong.

In recent decades all that has changed. For one thing, rayon and other synthetics challenged cotton in price and in strength. Also, the textile industry learned that if the consumer was not lured with attractive textiles, she would spend her money on a new television set or on some other appealing item, instead of on a new outfit.

Textile mills began to spend thousands of dollars on research to discover better finishes. In the United States the Department of Agriculture, worried by the cotton surplus, financed

extensive research. These efforts are paying off very well. The present problem is that it is almost impossible to know exactly what many finishes do for the fabric. In general, it is known what a finish *can* do, *if* it is properly applied. But, with few exceptions, there is no guarantee that a finish will perform as advertised. Here, we'll discuss the various finishes briefly and see what they are designed to accomplish.

Trade Names

66. According to the dictionary a trade name is simply the name used in the trade for a given product. By that definition, all the fabric names you have studied are trade names. But, in the field of textiles, as well as in other fields, the term trade name is more commonly used to describe a name that is used as trademark by a certain company.

When a company has spent thousands of dollars on research to produce a desirable finish, it naturally wants to make a profit on this development. Under the law, the company that holds the trademarked name can either keep the name and the process to itself or can license other companies to use the trade name and process under a royalty agreement. The question in the mind of the consumer is, of course, How good is a trade name? There is no general answer to that question.

You may, for instance, find the label "Sanforized" on a piece of cotton goods. This implies that the cloth has been shrunk by a compressive shrinkage process trademarked by Cluett, Peabody and Company. The process is based on careful tests, and the cloth should not shrink more than 1 per cent in laundering. You can rely on such a trade name because it is backed by a well-known concern. Then again, you may see a label "Mercerized" on a piece of cotton goods. This *may* mean that the cloth is woven from high-quality, mercerized yarns. On the other hand, it may mean only that the goods have been run at high speed through a caustic soda bath, just to give them a little luster. Generally a label or a trade name is only

as good as the company that backs it. There is, however, still another way of assuring the consumer of good quality. Some companies retain laboratories, such as the United States Testing Company, to test their goods. In that case you may find a label "Certified Merchandise" on the goods. You can then assume that the goods are as represented.

In our discussion we'll mention the most common finishing, dyeing, and printing methods applied to cotton goods. You'll then know what you can reasonably expect from goods sold as "waterproof," or "vat dyed." But until and unless somebody *guarantees* that the goods are what they should be, you can't be sure. Don't write your instructor that you bought some goods described as vat-dyed at the Fli-Bi-Nite bargain counter, and that all the color came out when you washed the cloth, and that your instruction text is all wrong! Also, don't expect to find every single trade name or process listed here. Cotton-fabric finishing is developing rapidly; new finishes appear on the market every few months. You should read a trade magazine if you want to keep up to date on modern textiles.

Calendering and Similar Finishes

67. In its simplest form, calendering is a pressing process. It produces a flat, shiny, smooth surface. In this process the cloth is passed, under pressure, between smooth, heated calender rolls. The greater the heat and pressure, the more luster is produced.

Schreinerizing, a variation of calendering, is done with rollers that are covered with fine, parallel engraved lines. Schreinerized cotton cloth has a characteristic deep luster.

A chased finish is produced by running four to sixteen layers of cloth between the chasing rollers of the machine at one time. The pressure is therefore exerted by cloth, rather than by hard metal. The resultant luster is a deep-grained one, rather than a mere surface shine.

In beetling, the cotton fabric is pounded with heavy faller while being wound on a roller. The yarns are spread out and as a result give a lustrous effect and a flattened surface structure to the cloth. Beetling gives a linenlike appearance to cottons. Chasing is intended to give a finish simulating a beetled finish; however, a chased finish is more uniform than a beetled finish, unless it is combined with a moiré effect.

The moiré, or watermark, finish is another variety of calendaring. It is done with calender rolls that have designs embossed or engraved on them. Depending on the designs the moiré finish may be used to imitate damask or beetling.

Embossed finishes go one step further than the moiré finish. Instead of simply flattening certain sections of the fabric in accordance with a given pattern, the pattern in an embossed fabric is actually raised or lowered. For instance, plain chint may be embossed to resemble quilted chintz.

The finishes applied to cotton goods by calender rolls often disappear at the first washing unless the fabric is specially treated. Cotton is not a thermoplastic fiber; that is, it will not permanently retain a finish given to it by heat and pressure. However, if cotton fabric is first treated with thermoplastic resin, most of the finishes given it will be permanent.

Crease-Resistant Finishes

68. Perhaps the greatest disadvantage of cotton and linen fabrics is that they wrinkle easily and retain the creases until they are ironed again. Nothing much was done about this state of affairs until after World War II. Then a number of finishes were developed to improve the resistance of cotton and linen fabrics to wrinkling.

In general, an anti-crease finish is a method of treating fabrics with a synthetic resin which aids them to resist and recover from wrinkling, or creasing. The finish can be used on cotton, linen, rayon, and combination fabrics. There are many such finishes on the market today, some effective and

others not too good. Here are a few crease-resistant finishes that are well known:

Superset Resin Finish is a registered trademark owned by the American Cyanamide Company; it refers to a resin-product finish which renders cotton wrinkle-resistant.

Tebelized is the registered trademark of Tootal, Broadhurst and Lee Company. The finish is applied, by a license arrangement, to materials which conform to specified standards of crease resistance and quality established by the trademark owner.

Wrinkle-Shed is a trademark owned by the Dan River Mills. It is the name for their process of applying to cotton fabrics, in finishing, certain resins and curing treatments that make the finished material resist wrinkles.

Crisp and Sheer Finishes

69. Women demand sheer fabrics that offer little resistance to the passage of cool air and admiring glances. Furthermore, they want these fabrics to look neat and crisp. The sheerness of a fabric can be improved by gassing. The crispness can be improved by starch or by permanent finishes.

Gassing, or singeing, consists in burning off protruding fibers from cotton yarns or fabrics by passing them rapidly over gas flames or between heated copper plates. This gives the cloth the smooth surface desirable for fabrics to be printed and for fabrics such as gabardine and sateen on which clear finishes are desired. The burnt fiber ends are liable to look yellow; so gassing is often followed by bleaching.

Starching, or sizing, is a finishing process in which a stiffener is added to the yarn or fabric to provide increased strength, stiffness, smoothness, or weight. The degree of stiffness given to materials can be varied as desired. Any of the following substances may be used as the base of a sizing mixture: corn, wheat, or potato starch; dextrine; gelatine; or gum. The

trouble with starching is that the starch is removed in laundering.

70. Durable finishes have been developed to take the place of starch in finishing. A good example of a durable stiffener is *Lacet Resin*, a resin product based on melamine. *Lacet* is a trade name of the American Cyanamid Company. This finish is used often on sheers and curtains. It not only adds crispness but also controls shrinkage and stretching. For durable starchless finishes, it is important not only to use a suitable resin but also to apply the material correctly.

Some of the starchless finishes are well known by their trade names. Here are a few of them:

Bellmanized is the trade name for a durable, starchless finish that is used for dress and curtain fabrics and is produced by the Bellman Brook Bleachery Company. It is used mainly on organdy and muslin.

Staze-Rite is the trade name of Joseph Bancroft and Son Company for a starchless finish applied to cottons. It keeps crisp after laundering several times and resists dampness and heat.

Vita-Last is the trade name of a process used by the United States Finishing Company for applying a starchless finish to sheer cottons.

As you have seen, resin finishes are used as crease-resister finishes and also as starchless stiffeners. They can fill other needs too. For instance, they may keep a loose fabric from sagging; they are then called anti-sag finishes. Also, not being affected by moisture, they do not wilt, as starch finishes do under the influence of humid weather and perspiration; hence they may be called anti-wilt finishes.

One important item to remember is that resins are thermoplastic. Instructions regarding ironing temperatures must be carefully followed, or the resin is liable to become tacky and sticky.

Fire-Retardant Finishes

71. Cotton fabrics burn easily unless they have been especially treated. Cotton can be made flame-resistant by a fire-retardant finish. A fabric so treated may be destroyed by flames from another source, but will not catch fire or continue to burn by itself. Cotton fabrics so treated should be called flame-resistant or fire-retardant. The term fireproof should be used only for fabrics like asbestos, which cannot be destroyed by fire.

You can make a simple flame retardant by dissolving 5 oz of ammonium, 16 oz of common alum, 3 oz of boracic acid, and 5½ lb of borax in 6 pints of water. Let the fabric soak in the solution, dry it, and it will then be flame-resistant. Such a finish, however, must be renewed after each washing.

Permanent fire-retardant finishes have also been developed. The following are a few of them:

Erifon is a trade name for a durable flame-resistant finish made by DuPont, which lasts for the life of the garment. It withstands washing, dry cleaning, exposure to weather, and storage. The organic salts of the finish react with the cellulose molecules of the fiber, making the flame resistance permanent.

Neva Flame is a flame-retardant process which can be applied to cotton and rayon materials. The trade name belongs to Barrett Amalgamated Industries.

Pyroset is the trade name of the American Cyanamid Company for a durable fire-retardant finish. Pyroset-treated fabrics are free from any tendency toward browning or discoloring when hung near radiators or heat outlets. They will not become soggy or damp in wet weather, as did fabrics treated with some early types of fire retardants.

Glazing

72. Cotton fabrics such as chintz can be given a smooth, bright, polished luster. For this purpose, the fabrics may be

treated with starch, glue, paraffin, or shellac and run through a hot friction calender. However, the glazed finish does not withstand washing unless chemicals such as synthetic resin are baked in at high temperatures.

Everglaze is an outstanding example of permanent glazing. This process, trademarked by Joseph Bancroft and Sons Company, produces a hand and glaze that last through repeated launderings and dry cleanings. The finish also stabilizes the fabric to a guaranteed shrinkage of less than 2 per cent, provides unusual soil resistance, and adds to the durability of the fabric. Although only one is mentioned here, there are other permanent glazing processes to be had.

Insulating Finish

73. Milium is the trademark of Deering, Milliken and Company for their metal-insulated fabrics. Practically any fabric of natural or man-made fibers, or blends of these, can be metal-insulated, using as a barrier of radiant heat aluminum or other metal flakes in a resin base. These porous, metal-insulated fabrics allow the body to breathe freely, provide insulation against cold, and prevent the loss of body heat. In summer, they reflect the rays of the sun, thus keeping the wearer cooler.

Mercerizing and Pucker Finishes

74. When properly done, mercerizing will produce a permanent luster on cotton and linen yarn or cloth. The yarn or fabric to be mercerized is immersed, under tension, in a cold, strong caustic soda solution. The solution tends to shrink the fibers, but since they are under tension, they stretch straight and become round in cross section. The material becomes stronger, more lustrous and more absorbent, and its dyeing properties are improved. A short exposure to a weak solution will produce only partial mercerization. The fabrics may then be called semimercerized.

When parts of the fabric are treated with caustic soda solution while the fabric is not under tension, the treated parts will shrink. This will cause the untreated sections of the cloth to pucker. The pucker, or crinkle effect, is permanent. It is applied in the finishing of crinkle crepe and similar fabrics.

Mildew-Resistant Finishes

75. Fabrics may be treated chemically to resist damage by mildew and mold. Some mildew-resistant chemicals are poisonous and some wash out with laundering. However, there are a number of finishes that are safe and permanent.

Dan-Dew, a trade name of Joseph Bancroft and Sons Company, is the name of a characteristic process for making materials mildew-resistant. It is nontoxic and withstands laundering and dry cleaning.

Napping and Suede Finish

76. Flannel and similar fabrics have a soft, fuzzy, napped effect. This is produced by napping, a finishing process that raises the fibers of the fabric to the surface by means of revolving cylinders covered with sharp, brushlike metal points or with teasel burs.

For a finer, shorter, and denser nap, emery rolls are used. This process is called suede finishing, because it makes the cloth surface resemble suede leather.

Scouring and Bleaching

77. In American usage, the word scouring is synonymous with washing; that is, scoured fabrics are goods that have been washed with water and soap or some other detergent. In English usage, the word scouring is synonymous with kiering. In this process, wax and other substances present in cotton fabrics are removed by boiling the goods in a weak alkaline solution, usually a very diluted caustic soda solution.

Scouring, or washing, cleans the cotton goods and removes

the starch size introduced into the warp yarns for weaving. Kiering goes a step further and makes the goods not only more absorbent but also whiter. Yet to get a really good white, especially on cottons that are gray or brown by nature, the goods must be bleached. The chemical most commonly used for bleaching is hypochlorite, but hydrogen peroxide may also be used. Bleaching, especially when done with hypochlorite, must be very carefully controlled. Otherwise the fabric will be weakened and will not give the wear you would ordinarily expect.

Shrinkage-Resistant Finishes

78. Cotton fabrics do not shrink and felt the way woolen fabrics do. However, the fabrics contract when the weaving tensions are relaxed by washing and drying. Cotton fabrics are sometimes stretched while wet and then dried under tension. Later, when the fabric is washed and dried without tension, it will shrink to the point where all tensions are relaxed. If fabrics are made into garments before the tensions are relaxed, the garments will shrink out of form and fit at the first laundering. To prevent this situation, methods have been developed to preshrink the fabrics. This must be done accurately for the best results. Methods of applying shrinkage-resistant finishes, that is, controlled preshrinking methods, are often shown by trade names.

Sanforized, a trade name of Cluett, Peabody and Company, indicates a checked standard of shrinkage. The name is applied to fabrics that have been shrunk by the compressive shrinkage process, and indicates that the residual shrinkage of the fabric is less than 1 per cent. Tests are made by the trademark owner to insure that the shrinkage conforms to the 1 per cent standard.

Rigmel Shrunken is a trade name of the Bradford Dyeing Association for their special shrinking process. The process gives improved hand and appearance to fine cottons. Here

also the residual shrinkage is kept within 1 per cent. For example, cotton goods that are 30 in. wide will shrink less than $\frac{1}{8}$ in. in width during washing; and a 3-yd length of fabric will shrink only 1 in. or less in length when you wash it.

Water-Repellant Finishes

79. Included under the general heading of water-repellent finishes are at least three different types of finishes: waterproof, water-repellent, and shower-repellent. Also, you may hear various finishes referred to as rainproof, showerproof, water-retarding, spot-resistant, and so forth. Let's look at a few of the methods used to make fabrics shed water.

The term waterproof signifies that a material has been treated so that water cannot pass through it. The usual method is to form a continuous film on the cloth with rubber, linseed oil, or cellulose. This closes the pores of the fabric and makes it impervious not only to water but also to air. Waterproofing may work to disadvantage in garments and certain other articles made of textile materials. For instance, body moisture will condense on the inside of a waterproof raincoat.

For most purposes, water-repellent fabrics are better than waterproof ones. These should shed rain like a duck but permit air to filter through. Of course, if water is permitted to stand on a water-repellent fabric, it will seep through after a while. There are some water-repellent finishes that have to be renewed after washing, while others are permanent. Some of the more common trade names are given below:

Impregnole is a trade name of the Warwick Chemical Company. Their process makes fabrics repellent to water and perspiration spots. This treatment is not durable but is particularly suitable for fabrics that will not be laundered or dry-cleaned frequently. It must be renewed after repeated laundering or dry cleaning.

Permel Resin Finish is a trade name of the American Cyanamid Company for a durable water-repellent finish. The

finishing process also controls the shrinkage of the fabric. Resins are used to impart the repellent finish, and these can be combined with other resins to give crease resistance.

Zelan is the trade name of DuPont for its durable water-repellent finish. Fabrics treated with the finish shed water and resist all spots or stains with the exception of grease. The treated fabrics also resist perspiration and wrinkle less easily.

Fabrics that resist water will also resist penetration by stains dissolved in water. A garment thus treated will keep cleaner longer, require fewer washings and cleanings, and give longer wear. Consequently, fabrics for suits or dresses are often given permanent water-repellent finishes by means of resin or silicone. If laboratory tests show reasonable resistance, the fabrics may be said to have a spot-and-stain-resistant finish. Actually, the finishes for water repellency and stain resistance are more or less the same. The different terms are used simply to draw the attention of the consumer to the more desirable property in a particular case.

Dyeing Methods

80. Some fabrics are used in their natural shade or as they are after bleaching. But most fabrics are given different colors by dyeing or printing. Dyeing can be classified according to the manufacturing stage at which the dyes are applied:

Piece dyeing is done after the cloth has come from the loom. The woven gray goods are usually kiered or otherwise prepared before dyeing. Piece dyeing is used chiefly to obtain solid shades and full colors. Examples include green organdy, black crepe, or navy-blue dress goods, and tan uniform cloth. The method is ideal for high production at a reasonably low cost.

Yarn, or skein, dyeing is done to the yarn in skein, package, or warp form. This method is popular for cloths which show stripes, checks, or plaids of different colors in the pattern. Examples are gingham, tickings, plaids, and herringbones.

Stock dyeing is applied to the loose fiber stock before it is carded and spun into yarn. The dyeing is done in vats or kiers. Stock-dyed yarns are used for such fabrics as homespun and covert and for fabrics of mixed colors like heather. It is ideal for obtaining casts, shades, tones, and hues of a color in a single fabric.

81. Fabrics that consist of more than one kind of fiber are gaining in importance. Some fibers, such as rayon and cotton, take practically the same dyestuffs. Other fibers, such as acetate and wool, must be dyed with different dyes. When two such fibers are present in the same fabric they may be dyed in the same shade or they may be dyed in different shades.

Union dyeing is the dyeing of a fabric in one dye bath with suitable dyestuffs to produce a more or less solid color throughout the material. For example, in the union dyeing of a cotton and acetate fabrics, a brown cotton dye and a brown acetate dye are used.

Cross dyeing is the dyeing of a fabric in two different shades. In a cotton and acetate fabric, for example, the cotton may be dyed while the acetate remains white. For another example, a cotton dress fabric with an acetate overplaid may be dyed in a bath that contains blue cotton dye and red acetate dye. You'll get a blue fabric with a red plaid.

82. You can also classify colored fabrics by the type of dyestuff that has been used. Here we'll mention only a few that are important for cotton fabrics.

Vat dyeing is done with an insoluble type of dye. In the dyeing operation the vat dye is reduced to a soluble form, set on the fiber, and then oxidized to the original insoluble state. Being particularly fast to sunlight and washing, this dyestuff is very popular for the dyeing and printing of cotton materials.

Direct, or commercial, dyeing is done with dyes that have an affinity for most textile fibers. It is used chiefly when color resistance to washing is not vital.

Fluorescent dyes are designed to impart to textile fibers and fabrics an unusual color brightness, both in daylight and in black light (ultraviolet radiation). Most of these dyes, however, fade after a while.

Any dyestuff or dyeing method is good only if it is properly applied. Consequently the consumer must rely on the manufacturer, or on the store where he buys, to test the material. Here, as in finishes, a reliable source of supply and a reliable trade name are the best guarantees available.

Printing Methods

83. Printing consists in impregnating parts of the fabric surface with suitable dyes, to form a desired motif. Most printing is done with rollers on which the pattern is engraved. The raised portions of the roller carry the dyestuff, which is dispersed in a suitable color paste. Such printing is called direct printing.

There are different varieties of printing. For instance, there is resist printing, in which the fabric is printed with a substance that resists dyeing. Then when the fabric is dyed, the printed portions will not be dyed. Another type is discharge printing, in which a dyed fabric is printed with a substance that will destroy the color at the affected parts. The printing methods used depend on the pattern to be produced. You can readily see, for example, that blue polka dots on a white ground are best made by direct printing. But to produce white polka dots on a blue ground, discharge printing would be used.

Small runs of extensive patterns are often made by screen-process printing. In this method the cloth is put on a table and covered with a stencil supported by a fine screen. Color is then applied to the parts of the cloth that are visible through the stencil. The stencil is then moved to another portion of the cloth and the process is repeated. Then to another portion of the cloth, and so on, until all the cloth is printed.

Cotton Fabric Uses

Government Listing

84. A publication listing the various uses of cotton fabrics has been prepared by the United States Department of Commerce. Included in this list is the application of industrial and mechanical fabrics. Some of these fabrics have not been previously mentioned in this text. As a textile student, the alphabetical arrangement of items should be most helpful.

ABRASIVE (Emery cloth, etc.): Cheesecloth, drill, duck, jean, Osnaburg, sheeting, tag cloth, and twills used for backing.

ADHESIVE PLASTER: Cheesecloth, crinoline, moleskin, sheeting, muslin.

ADVERTISING: Batting and wadding, bunting, cambric, cheesecloth, drill, duck, felt, flannel, imitation leather, lawn, muslin, oilcloth, Osnaburg, print cloth, ribbon, sheeting, tapes of many kinds.

AIRCRAFT: Airplane and balloon fabrics as covering, duck for propeller blades (impregnated and compressed) and airplane socks (field guides as to velocity of wind at time of landing).

APRONS, HOUSEHOLD, and so on: Butcher's linen, chambray, chiffon, crepe, cretonne, dimity, duck, drill, flannel, lace, gingham, madras, muslin, Oxford, percale, plaid, prints of many types, sheeting, ticking, tapes, braids, fringes, voile.

ARMBANDS, GARTERS, SUSPENDERS: Braids, elastic cord, elastic fabrics, hickory cloth, webbing, felt for brassards.

ARTIFICIAL FLOWERS: Buckram, crinoline, drill, cotton-back duvetyne, imitation leather, muslin, nainsook, organdy, print cloth, sateen, cotton-back satin, sheeting, soisette, tulle, velours, cotton-back velvet, velveteen.

ASPHALT CASES: Shredded cotton as binder.

ATHLETIC AND SPORTING GOODS:

BATTING: In padding boxing gloves, for shoulder pads mattresses.

DUCK: For backstops, and bags in golf, baseball, volley ball, golf targets, kayaks, stretchers, creels, shell bags, shin-guards, and protectors of many types, surfboards.

ELASTIC FABRIC: For supports, gores in apparatus.

NETS: For use in tennis, basketball, lacrosse, as backstops etc.

TUBING: For covering golf club heads, and other athletic supplies.

WEBBING: For use in uniforms and straps of various types.

ATHLETIC UNIFORMS: Batting, duck, holland, jersey cloth, khaki cloth, nainsook, Oxford, rep.

HUNTING SUITS: Bedford cord, corduroy, duck, hickory cloth, imitation leather, jean, jersey cloth, khaki cloth, moleskin, oilcloth, rep, rubberized fabric, waterproof fabric.

SHIRTS: Broadcloth, cotton burlap, cottonade, crash, denim, drill, duck, hickory cloth, holland, jersey cloth, hose.

TICKING: For use in mattresses.

AUTOMOBILE CURTAINS AND TOPS: Imitation leather; rubberized and waterproof fabrics.

AUTOMOBILES: Awnings, upholstery, tires, straps, luggage, trunks, roofing, automobile curtains and tops, cleaning cloths, cushions, pillows, electrical supplies, gaskets, gears, linoleum, shock absorbers, transmission, and brake lining.

AVIATION: Airplane fabrics for wind indicators; duck for field markers and roof markers; tarpaulins for protection of unhooused planes.

AWNINGS, CANOPIES, BEACH SHADES, ETC.: Awning stripes, denim, drill, khaki cloth, Osnaburg, sheeting, tapes, ticking, braids, cord, fringes, tape, and webbing for trimming.

BABY CARRIAGES: Batting, bedford cord, braids, corduroy, cords, elastic cords, fringes, tapes and laces as trimmings, imitation leather; oilcloth, waterproof fabrics.

BACKING (Shoe leathers): Duck; sheeting.

BAGGING (Baling): Baline, cotton burlap, Osnaburg.

BAGS: Canton flannel for jewelry, silverware bags. Cheesecloth for bags for dyes, herbs, spices, and tea. Crash for work bags, seed bags. Crepe for household bags; cretonnes, gingham and muslins for laundry, shopping, work, clothespins, wardrobe. Denim and drill for clothes, shoes; for bean-bags and bags for coin, gold; duffle bags, dunnage and sea bags; mailbags; bags for masons' tools, news, and miners (coal, ore and dirt); nose bags; vacuum-cleaner bags; cotton-picking bags; shell bags.

Osnaburg for bags for fertilizer, grain, lime, nitrates, salt, seed, soap, starch. Sateen for clothes-, hat-, and shoebags. Sheeting for bags for clothes, silverware (napped), shoe, feed, grain, salt and bags for sugar (lining in jute bags); waterproof fabrics for bathing-beach bags.

BANDAGES: Sheeting, muslin, narrow fabrics, cheesecloth, gauze.

BASES: (Protectors against scratching): Baize, felt.

BASKETS: Duck.

BATHING SUITS: Knit goods, sateen, satin with cotton-back.

BATHROBES: Blanket cloth, corduroy, éponge, flannel, ratine, terry cloth.

BATHTUBS, BASINS, BUCKETS: Duck, waterproof fabrics.

BEACH BAGS: Terry cloth, prints.

BEACH PADS: Awning stripes, duck, imitation leather, bathing, rubberized fabrics, waterproof fabrics.

BEACH ROBES AND COSTUMES: Basket-weave fabric, beach cloth, brocade, chambray, corduroy, crash, crepe, cretonne, duck, gingham, lawn, madras, moire, muslin, Oxford, piqué, plush, pongee, poplin, ratine, sateen, cotton-back satin, seersucker, soisette, terry cloth, cotton-back velvet, velveteen, Venetian.

BEADS (Tire): Enameling duck, sheeting.

BEDSPREADS: Cretonne, damask, dimity, flannel, gingham, Jacquard fabric, muslin, organdy, pongee, poplin, print cloth, sateen, cotton-back satin, seersucker, embroidery braids, fringes and lace for trimming.

BEE VEILS: Muslin.

BELTING AND CONVEYORS: Braids, drill, duck, Osnaburg, scrim for starch aprons in laundry machinery, sheeting, tapes, triple fabric, woven belting.

BELTS (Men's and women's): Artificial leather, braid, cord, oilcloth, webbing.

BIAS BINDINGS: Cambric, lawn, percale, twill.

BIBS (Baby): Basket-weave fabric, batiste, broadcloth, cambric, crash, crepe, dimity, gingham, madras, muslin, oilcloth, pajamas checks, piqué, pongee, poplin, rubberized fabrics, terry cloth, swiss.

BINDINGS: Braid, cambric, duck, lawn, muslin, nainsook, print cloth, sateen, tape, thread, webbing.

BLANKETS: Blanket fabric.

BOATS AND CANOES: Duck for collapsible boats, canoe covering, sails.

BOOKBINDING: Book fabric, buckram, cheesecloth, drill, duck, imitation leather, oilcloth, Osnaburg, percaline, print cloth, sheeting.

BOOKS: Muslin, sheeting, print cloth.

BRASSIERES, CORSETS, GIRDLES: Batiste, calico, cambric, coutil, drill, duck, elastic fabric, Jacquard fabric, jean, lace, cotton-back satin, sateen, sheeting, tape, webbing.

BRIDGE AND TUNNEL DODGERS: Cord, duck.

BROOMS, BRUSHES AND WHISKS: Duck, sheeting, twine, velvet.

BUFFERS: Cheesecloth, denim, duck, felt, flannel, Osnaburg, sheeting.

BUTTONS: Practically all fabrics that are used for women's and children's wearing apparel.

CAPS: Men's and boy's caps of beach cloth, Bedford cord,

buckram, corduroy, crash, eiderdown, elastic fabric, felt, hickory cloth, holland, khaki, madras, covert, plush, poplin, rep, rubberized fabric, serge, suede, terry cloth, waterproof fabric, tape and webbing. Babies' caps of lawn, lace, mull, muslin, organdy, outing flannel, piqué satin. Boudoir caps of batiste, broadcloth, calico, cambric, chambray, gingham. Chantilly lace, chiffon, crash, crepe, cretonne, lace, lawn, marquissette, muslin, netting, piqué, pongee, ribbon, sateen, scrim, soisette, voile. Interlining and lining for caps are made of canton flannel, cotton-back satin, flannelette, sateen, suede fabric. Yachting caps of duck.

CARCASS (Tire): Duck.

CARD LACE (Loom): Twine, cord.

CASES (Gun, level, rod): Duck, drill, imitation leather, sheeting, tape, thread. Waterproof fabric for lining: Flannel and napping sheeting.

CASKETS: Lining of braid, broadcloth, brocade, flannel, casement cloth, charmeuse, chiffon, crepe, eiderdown, fringe, longcloth, moire, muslin, nainsook, net, organdy, piqué, pongee, poplin, scrim, soisette, suede fabric, terry cloth, Venetian, velours, velveteen. Batting is used for padding, and casket cloth for covering.

CHAFER STRIPS (Tire): Square-woven fabric.

CHAIRS AND COTS (Beach and porch chairs, stools, army cots, etc.): Awning stripes, cotton burlap, duck, Osnaburg.

CHUTES (Fire escape, feed, water): Plain duck, coated duck.

CLEANING CLOTHES: Mops of drill, cheesecloth, knit goods, tape, twine, webbing. Pot cleaners of tinsel yarns. Polishing cloths of cheesecloth, drill, duck, sheeting suede fabric.

COATS, WOMEN'S: Beach cloth, broadcloth, brocade, Cheviot, corduroy, crepe, drill, duck, duvetyne with cotton-back, flannel, hickory, jean, jersey cloth, khaki cloth, moire, plush, serge, velvet with cotton-back, velveteen.

COLLARS, MEN'S: Bedford cord, broadcloth, longcloth,

madrás, muslin, print cloth and comparable fabrics for shirting and collar material, tape, and webbing for binding.

COMFORTABLES AND QUILTS: Coverings and linings of cambric, challis, cotton-back satin, drill, duck, holland, marseilles, muslin, sateen, sheeting. Fillers use batting and wadding, linters, wastes.

CORNUCOPIAS: Sheetting.

CORSETS AND GIRDLES: Basket-weave fabric, brocade, coutil, elastic fabric, lace sateens, tape for binding, twill.

COSTUMES, CARNIVAL AND THEATRICAL: Batiste, batting broadcloth, bunting, cambric, calico, cheesecloth, chiffon, corduroy, crash, crepe, cretonne, crinoline, drill, duck, flannel, gingham, jersey fabric, knit goods, marquissette, mull, muslin, nainsook, organdy, percale, piqué, pongee, poplin, ratine, ribbon, sateen, cotton-back satin, seersucker, serge, sheeting, soisette, swiss, terry cloth, velours, velveteen, voile, webbing.

COTTON-PICKING SACKS: Listed under bags.

CURTAINS: Basket-weave fabric, bobbinet, bunting, cheesecloth, chiffon, crash, fringe, lace lawn, marquissette, muslin, net, Osnaburg, scrim, soisette, swiss, tinsel, several types of novelty yarns.

CUSHIONS AND PILLOWS: Ticking—awning stripes, cambric, cretonne, damask, denim, drill, duck, muslin, organdy, print cloth, cotton-back satin, sheeting. Cushion and pillow covering—awning stripes, basket-weave fabric, beach cloth, broadcloth, brocade, cambric, calico, chambray and chambray gingham, charmeuse, Chantilly lace and net, chiffon, corduroy, cottonade, crepe, damask, denim, duck, duvetyne, fringe, gingham, Indian linon, Jacquard fabric, jean, khaki cloth, lawn, longcloth, cadras, marquissette, moire, moleskin, muslin, nainsook, novelty yarns of many varieties, organdy, pajama checks, pin checks, plush, pongee, poplin, print cloth, ratine, rep, ribbon, sateen, scrim, seersucker, soisette, suede, swiss, tapestry, terry cloth, velours, velvet, Venetian, voile. For pillow cases—broadcloth, pongee, Indian linon, muslin, print cloth, sheetting.

DAUBERS: Twine.

DESKS: Duck for backing of roll-top desks; imitation leather and linoleum for covering of desktops.

DOCTORS' AND ATTENDANTS' UNIFORMS: Beach cloth, broadcloth, butcher's linen, cambric, duck, muslin, sheeting.

DOG NETS: Sash cord.

DOLLS: Batting, batiste, bird's-eye, broadcloth, cambric, charmeuse, challis, cheesecloth, corduroy, cottonade, cotton waste for filler, crash, crepe, cretonne, damask, denim, dimity, duck, duvetyne, embroidery, felt, flannel, gingham, holland, imitation leather, Jacquard fabric, jersey cloth, lace, lawn, muslin, Nainsook, net and netting, novelty yarn, oilcloth, organdy, Oxford, pajama checks, percale, pin checks, piqué, plaid, plush, pongee, poplin, print cloth, ratine, rep, ribbon, rubberized fabric, sateen, cotton-back satin, scrim, seersucker, sheeting, soisette, stockinet, swiss, terry cloth, thread, tufts, velour, velveteen, Venetian, voile.

DRAPERIES: Basket-weave fabric, beach cloth, cambric, casement cloth, corduroy, crepe, cretonne, damask, drill, duck, etamine fringe, gingham, hammock fabric, Jacquard fabric, marquissette, momie cloth, moire, muslin, net, Osaburg, plush, poplin, sateen, cotton-back satin, sheeting, soisette, tobacco cloth in printed effects, tapestry, tarlatan, terry cloth, velours, cotton-back velveteen, voile.

DRESS GOODS AND DRESSES, GENERAL: These include practically every type of cotton fabric, from the very fine sheers to the coarse, heavier grades of materials. The basic weaves used are plain, twill and satin. Derivations of the plain weave are also used as in the case of seersucker, chambray, crepe, dimity, gingham and madras. Other small repeat weaves are also used—herringbones, baskets, double satins, ribs, twilled baskets, etc. Fancy designs are often a feature of some of these dress-goods materials. Knitted fabrics are also used in this category. The construction, yarn count, texture, surface-

effect, pattern, and finish of the various fabrics determine largely their end-use.

DRESS SHIELDS: Cambric, rubberized fabric.

DROP CLOTH: Drill, duck, Osnaburg, and sheeting are used by painters and other artisans to protect floors and furniture.

EAR MUFFS AND PROTECTORS: Outing flannel, cotton-back velvet, velveteen, braid, thread.

ELECTRICAL SUPPLIES: For use as insulation upon magnets, armatures and wires, the following fabrics are used: Braid, drill, duck, muslin, Osnaburg, print cloth, sheeting, tape for cable identification, tubing, as well as twine.

END CLOTHES (Bleaching and dyeing): Drill, print cloth, sheeting.

EYE SHADES: Duck, drill, sheeting, imitation leather.

FANCYWORK AND EMBROIDERY: Basket-weave fabric, broadcloth, cretonne, chiffon, crash, damask, dimity, flannelette, gingham, jersey cloth, lawn, madras, muslin, nainsook, net, Oxford, pongee, poplin, sateen, swiss, sheeting, sponge fabric, terry cloth, voile, cotton-back velvet, velveteen.

FILLER (Shoe sole): Felt.

FLAGS: Bunting, print cloth, sheeting, tobacco cloth, tape, fringe.

FLAPS (Tire and splash): Osnaburg in a twill weave, sheeting, and flannel are used for tire flaps; imitation leather is used for splash flaps.

FLOOR COVERING: Duck, covert, felt for soundproofing and insulation, linoleum, Osnaburg, sheeting, terry cloth, webbing and braid for trimming oilcloth.

FOUNDATIONS ON UNPLASTERED WALLS FOR PAPERING: Cheesecloth, tobacco cloth.

FUMIGATION (Citrus fruit culture): Duck.

FURNITURE, CAMP: Drill, duck, awning stripes.

GASKETS: Duck, felt, sheeting.

GAS MANTLES: Knit goods.

GEARS: Drill or duck in layers, impregnated and compressed.

GLOVES: Canton flannel, drill, flannel, jersey cloth, knit goods, lace, tape, suede fabric, tubing, webbing.

GRASS CUTTER (for lawn mowers): Duck.

HAMMOCKS, GARDEN SWINGS: Awning stripes, braid, cord and cordage, denim, duck, fringe, hammock cloth, netting, tape, webbing. See also list for **AWNINGS**.

HAMPERS: Canvas.

HANDBAGS: See list for **POCKETBOOKS, PURSES, AND HANDBAGS**.

HANDKERCHIEFS: Batiste, chiffon, gingham, longcloth, marquisette, muslin, nainsook, organdy, pongee, print cloth, soisette, swiss, voile.

HARNES: Cordage, duck, tape, webbing. Collar facing and pads use awning stripes, chambray, denim, drill, duck, felt, print cloth, sheeting, ticking, webbing. Saddles used duck, felt, imitation leather, oilcloth, Osnaburg, webbing.

HATS: Men's hats use military cord, duck, felt, imitation leather, khaki cloth, netting, oilcloth, ribbon, rubberized fabric, sateen, cotton-back satin, webbing. Women's hats use braid, buckram, chiffon, cord, crepe, hair-cloth, holland, imitation leather, khaki cloth, lace, moire, netting, sateen, cotton-back satin, tarlatan, terry cloth, velours, velvet, voile, velveteen, waterproof fabric.

HAY COVERS: Duck.

HEDDLES FOR LOOMS: Twine.

HEEL PADS AND CUSHIONS (Shoes): Flannel, felt.

HEELS, ORTHOPEDIC: Duck.

HOSE (Fire, Garden): Drill, duck, Osnaburg, sheeting, triple cloth, tubing.

HUSKING GLOVES: Drill, flannel.

ICE-CREAM CONTAINERS: Duck serves for covering and liner.

IMITATION LEATHER: Drill, duck, jean, moleskin, nainsook, Osnaburg, sateen, sheeting.

INFANTS' WEAR: Basket-weave cloth, broadcloth, cashmere,

chiffon, crash, eiderdown, flannel, flannelette, fleece, gingham, Indian linon, jersey cloth, knit goods, lace, muslin, nainsook, organdy, pin checks, piqué, pongee, poplin, ribbon, sateen, cotton-back satin, serge, swiss, velours, velvet, velveteen, voile.

INNERSOLES FOR SHOES: Buckram, felt, duck, and Osaburg for re-inforcing.

INSULATION, ELECTRICAL: Cambric, muslin, sheeting, print cloth.

KIMONOS: Basketweave fabric, beach cloth, brocade, chambray, corduroy, crash, crepe, cretonne, foulard, gingham, lawn, madras, moire, Oxford, muslin, piqué, plush, pongee, poplin, ratine, sateen, cotton-back satin, soisette, swiss, velours, cotton-back velvet, velveteen, Venetian.

KITES, BOX: Muslin, sheeting.

LABELS, MARKERS, TAGS: Cheesecloth, imitation leather, oil-cloth, print cloth, rubberized fabric, sheeting, tape, webbing.

LAMP SHADES: Basket-weave cloth, braid, broadcloth, brocade, Chantilly lace, lace and net, chiffon, chintz, cord, crash, crepe, cretonne, dimity, embroidery, fringe, gingham, holland, lace, lawn, marquissette, muslin, nainsook, net, novelty yarn effects, organdy, pongee, print cloth, sateen, cotton-back satin, sheeting, soisette, swiss, tapestry, tinsel yarn, voile.

LEGGINGS: The men's types use drill, duck, khaki cloth, and corduroy for facing. Children's leggings use canton flannel, corduroy, eiderdown, velours, cotton-back velvet, velveteen.

LIFE PRESERVERS: Drill, duck, sheeting, tape.

LIGHTERS, CIGAR AND CIGARET: Absorbent cotton, imitation leather, wicking.

LININGS: Alpaca, baize, beach cloth, beaver fabric, brilliantine, brocade, buckram, calico, cambric, chambray, charmeuse, cheesecloth, chiffon, chintz, cottonade, crepe, crepe de Chine, crinoline, domett, drill, duck, duvetyne, eiderdown, flannel, foulard, gingham, Indian linon, jean, knit goods, madras, moire, moleskin, moreen, mull, muslin, net, organdy, Osaburg, Oxford, percale, percaline, piqué, plush, pongee,

print cloth, rayon alpaca, sateen, cotton-back satin, scrim, serge, sheeting, suede, silesia, soisette, swiss, tarlatan, ticking, twill, velveteen, cotton-back velvet, velours, Venetian, voile, wigan.

LINOLEUM: Cotton burlap, Osnaburg.

LUGGAGE FOR BOXES, TRAVELING BAGS: Canvas, duck, imitation leather, and oilcloth are used for the body. For protecting purposes the following fabrics are used: brocade, burlap, cretonne, damask drill, duvetyne with cotton backing, hickory cloth, moleskin, poplin, ratine, sateen, sheeting, tarlatan. Linings and interlinings use broadcloth, brocade, buckram, cambric, charmeuse, cheesecloth, Cheviot, chintz, cottonade, cretonne, denim, drill, duck, flannel, gingham, hickory cloth, jean, moleskin, Osnaburg, plush, sateen, sheeting, velours, cotton-back velvet, velveteen.

MAPS, CHARTS: Cheesecloth, duck, muslin, print cloth, sheeting.

MARINE SUPPLIES: Batting and wadding and waste for calking; duck for boat covers, clothing caps, boat fall tub covers, fenders, hatch covers, mast collars, sails and sea drags. See lists for HAMMOCKS, LEGGINGS, LINOLEUM, MATTRESSES, FLOOR COVERINGS, MACHINERY, TARPAULINS.

MATTRESSES: Fillers use batting and wadding, linters, waste, felt. Ticking, covering and trimming use braid, chambray, cord, cretonne, drill, denim, duck, muslin, print cloth, sateen, cotton-back satin, sheeting, tape, ticking, tufts, webbing.

MEAT COVERING: Cheesecloth, drill, Osnaburg, sheeting, stockinette.

MEDICAL, SURGICAL AND SANITARY SUPPLIES: Sheetting and muslin serve as the base for backing for adhesive plaster; batting and wadding are used for absorbent cotton; cheesecloth, duck, and gauze are used for bandages.

Coutil, elastic cord, and elastic fabric, tape, and webbing

find use in many types of supporters. Elastic banding and hose are used in the medical field.

MILK-CAN JACKETS: Duck is used as a covering and liner.

MUSICAL INSTRUMENTS: Felts for pads in pianos, wind instruments; webbing in pianos.

NAPERY: Broadcloth, crash, crepe, damask, gingham, pongee, sheeting.

NECKWEAR, MEN'S: Beach cloth, crash, damask, flannel for lining, knit goods, pongee, print cloth, sateen sheeting, velveteen.

NECKWEAR, WOMEN'S: Basket-weave fabric, batiste, braid, broadcloth, brocade, chiffon, corduroy, dimity, drill, duck, cotton-back duvetyne, flannel, fringe, lace, lawn, marquissette, moire, mull, muslin, net, novelty yarn effects, organdy, pin checks, plaid, pongee, poplin, ratine, ribbon, sateen, cotton-back satin, soisette, swiss, terry cloth, velours, velvet with cotton backing, velveteen, voile.

OILCLOTH: Cheesecloth, drill, duck, muslin, print cloth, sheeting.

OVERALLS: Denim, drill, duck, dungaree, Cheviot, cottonade, covert, hickory cloth, jean, khaki cloth, sheeting, ticking. Webbing and tape are used in trimming.

OVERSHOES: Canton flannel, cheesecloth, drill, duck, flannelette, fleece, knit goods, moleskin, muslin, print cloth, sateen, sheeting, webbing.

PACKING, MOTOR AND PUMP: Asbestos fabric, Canton flannel, cheesecloth, drill, duck, muslin, Osnaburg, sheeting, wadding, waste, yarns. These are used in plain or impregnated forms.

PAJAMAS AND NIGHTGOWNS: Basket-weave fabric, batiste, broadcloth, cambric, chambray, chiffon, crepe, dimity, flannel, flannelette, gingham, knit goods, madras, nainsook, Oxford, organdy, pajama checks, percale, pongee, print cloth, sateen, soisette, voile.

PAPER, PACKING AND COVERING REINFORCED: Cheesecloth,

thread, and twine are used as re-inforcement upon a paper background, usually waterproofed.

PILLOWS, GARDEN: Bathing, imitation leather.

PIPE COVERING: Muslin, sheeting, duck, Osnaburg.

POCKETBOOKS, PURSES AND HANDBAGS: Basket-weave fabric, brocade, Chantilly net and lace, corduroy, crepe, cotton-back duvetyne, fringe, Jacquard fabric, madras, moire, moleskin, plush, poplin, ratine, ribbon, sateen, suede fabric, tapestry, terry cloth, velours, velvet, velveteen.

POCKETS, LOCKER: Drill, duck, muslin, sheeting.

PONCHOS: Waterproof fabrics of many types, rubberized materials.

POWDER PUFFS: Knit goods, plush, suede fabric, velours.

PROTECTORS, ATHLETIC BODY: Batting and wadding, drill, duck, khaki cloth.

RADIO: Felt for soundproofing purposes in studios, silence cloth for instrument base pads, and tapes and braids for head sets.

RAINCOATING, RAINCOATS: See WATERPROOF FABRICS, RUBBERIZED FABRICS.

RE-INFORCED USE FOR TIRES: Square-woven fabric.

RESTRAINT APPARATUS: Duck is used for sheeting of various types and textures for sheets, strait jackets, and similar articles.

ROBES AND WRAPS: Brocade, crepe, cotton-back duvetyne, Jacquard fabric, knit goods, marquissette, moire, net, lace, novelty yarn effects, plush, cotton-back satin, serge, tapestry, cotton-back velvet, velveteen.

ROLLERS FOR TEXTILE FINISHING MACHINERY: Duck in compressed layer formation.

ROOFING AND DECK COVERING: Drill, duck, waterproof fabrics.

RUBBERIZED FABRICS: Cambric, cottonade, drill, duck, cotton-back duvetyne, jean, lawn, Osnaburg, print cloth, sateen, sheeting, ticking.

RUGS AND CARPETS: Fringe, twine, webbing yarn.

SAEFTY DEVICES: Cord for nets, duck for life belts and preservers, fire nets, and chutes.

SCARFS: Basket-weave fabric, beach cloth, brocade, cambric, chambray, Chantilly lace, chiffon, crepe, cretonne, damask, dimity, flannel, fringe, lawn, madras, moire, organdy, plaid, pongee, print cloth, ribbon, cotton-back satin, soisette, suede, velours.

SCENERY, THEATRICAL: Drill, duck, netting, Osnaburg sheeting, cordage, rope, twine.

SCREENS AND PARTITIONS: Airplane fabric, awning stripes, basket-weave cloth, beach cloth, broadcloth, brocade, cotton burlap, casement cloth, corduroy, cottonade, crash, damask, drill, duck, duvetyne with cotton-back, fringe, gingham, hickory cloth, holland, Jacquard fabric, khaki cloth, marquissette, moire, momie cloth, muslin, Oxford, pongee, plush, poplin, ratine, sateen, sheeting, tapestry, velours, cotton-back velvet, velveteen.

SHIRTS: Airplane fabric, balloon cloth, basket-weave cloth, Bedford cord, broadcloth, Cheviot, cotton crepe, dimity, domett, drill, éponge, flannel, khaki, madras, marseilles, mole-skin, Oxford, percale, pin checks, piqué, pongee, soisette, swiss, wigan.

SHOCK ABSORBERS, SNUBBERS: Webbing.

SHOES: Brocade, drill, duck, print cloth, cotton-backed satin, sateen, terry cloth, cotton-backed velvet, velveteen for shoe uppers.

Duck is used for heel stays while eiderdown and felt are used in innersoles. Duck and Osnaburg are used in innersole reinforcing and duck, drill, sheeting and flannel are used for lining. Haircloth and netting find use for interlining, buckram for reinforcing and stiffening of shoe tongues. Drill is used to reinforce seams and as underlay for eyelets, buttons, buttonholes and tips. Flannel and sheeting are used as underlay for tips while narrow fabrics of various types are utilized to reinforce seams. Shoe trimming is cared for by narrow

tape, beaver cloth, brocade, and duck. Osnaburg is used to line rubber shoes and elastic fabric is used for goring; drill, felt, and flannel are used in heel pads for which wadding is used for build-up. Duck and sheeting find use for backing-up the upper fabrics used in shoes and also support thin leather often used in shoes. Felt serves as filler between the inner-sole and the outersole.

SHROUDS: Batiste, brocade, broadcloth, crepe, lace, long-cloth, moire, muslin, net, plush, pongee, sateen, soisette, swiss.

SILENCE CLOTH: Baize, felt, molleton.

SMOCKS: Broadcloth, brocade, calico, crash, crepe, cretonne, duck, gingham, lawn, longcloth, moire, muslin, percale, pongee, poplin, print cloth, sateen, sheeting, soisette.

STENCILS FOR WALL DECORATIONS: Lace.

STRAINERS, FILTERS, PRESS CLOTHS: Cheesecloth, drill, duck, sheeting.

STRAPS: Duck, ticking, webbing.

SUITS, MEN'S: Flannel, serge, tropical cloth.

TABLE COVERINGS (Runners, Sets, Doilies): Basket-weave cloth, beach cloth, broadcloth, cambric, chambray, chiffon, crepe, cretonne, damask, dimity, embroidery, flannel, gingham, knit goods, lace, lawn, madras, organdy, Oxford, piqué, pongee, sateen, cotton-back satin, sheeting, sponge cloth, velours, voile. As silence cloth, asbestos fabric, felt, flannel, imitation leather, oilcloth, plush and velvet made with cotton-back are used.

TANKS, EXHIBITION, SWIMMING: Duck.

TAPES: MEASURING: Narrow fabric, print cloth, sheeting.

TARPAULIN: Drill, duck, Osnaburg, sheeting.

TENTS: Awning stripes, cordage, denim, drill, duck, Osnaburg, serge, sheeting, tape, webbing.

TIRES: Tire cord and cord fabric are used for the carcass while square-woven fabric is used for valve pads, chafer strips, carcass and reinforcement. Doup or leno-woven fabric is

used for breakers, and enameling duck and sheeting are used for beads.

Flannel and Osnaburg made with a twill-weave construction are used for flaps, with duck, imitation leather, oilcloth, rubberized and waterproof fabric used for tire covers. Tire-repair material consists of duck and holland.

TOILET KITS: Canton flannel, crepe, cretonne, damask, denim, duck, imitation leather, jean, plaid, poplin, rubberized and waterproof fabrics, sateen and sheeting.

TOWELS AND WASHCLOTHS: Dish towels: Cottonade, crash, damask, glass cloth, Osnaburg. Bath towels: Novelty yarn effects, sponge cloth, terry cloth. Washcloths: Knit goods, sponge cloth, terry cloth. Face towels: Crash, damask, huckaback, knit goods, lace, novelty yarn effects. Tapes are much used in trimming towels and washcloths.

TOW LINES, AUTOMOBILE: Webbing.

TOYS: Absorbent cotton, airplane fabric, alpaca, awning stripes, baize, balloon cloth, basket-weave cloth, batiste, batting, beach cloth, broadcloth, brocade, calico, cambric, chambray, Chantilly lace, cheesecloth, chiffon, chintz; cord, rope and twine; corduroy, cottonade, crash, crepe, cretonne, crinoline, damask, denim, diaper cloth, dimity, drill, duck, duvetyne, elastic fabric, felt, flannel, gingham, gauze, hickory cloth, Indian linon, Jacquard fabric, jean, jersey cloth, khaki cloth, lawn, longcloth, madras, moire, moleskin, muslin, nainsook, narrow fabric of many types, oilcloth, organdy, Oxford, pajama check, percale, piqué, plush, pongee, poplin, print cloth, ratine, rep, ribbon of many varieties, sateen, cotton-back satin, seersucker, scrim, sheeting, soisette, stockinet, swiss, tapestry, terry cloth, ticking, velours, cotton-back velvet, Venetian, voile, waterproof and rubberized fabrics, webbing.

TRANSMISSION AND BRAKE LINING FOR AUTOMOBILES: Webbing.

TRIMMING FOR WOMEN'S WEAR APPAREL AND ACCESSORIES: Basket-weave cloth, bobbinet, braid, broadcloth, brocade,

chiffon, corduroy, crash, crepe, cretonne, denim, drill, duck, cotton-back duvetyne, elastic fabric, flannel, fleece, gingham, Indian linon, lingerie checks, longcloth, marquisette, moire, muslin, net and lace, organdy, pin checks, pongee, poplin, ratine, ribbon, cotton-back satin, sateen, scrim, seersucker, sheeting, soisette, swiss, tapestry, terry cloth, velours, cotton-back velvet, velveteen, Venetian, voile.

TRUCKS: Duck, webbing for straps and trimming, and cretonne.

TRUNKS: Cheesecloth, chintz, cotton burlap, drill, duck, felt, gauze, hickory cloth, imitation leather, jean, moleskin, muslin, sateen, sheeting, tape, ticking, tufts, cotton-back velvet, velveteen, waterproof and rubberized fabrics, webbing.

TYPEWRITER RIBBONS: Cambric, sheeting, tape.

UMBRELLAS AND PARASOLS: Awning stripes, broadcloth, cretonne, duck, fringe, gloria goods, muslin, print cloth, sateen, serge for covers, sheeting, umbrella gingham.

UNDERWEAR: Womens': Airplane fabric, braid, basket-weave fabric, batiste, broadcloth, brocade, cambric, Canton flannel, cashmere, crepe, charmeuse, chiffon, dimity, elastic fabric, flannelette, fleece, gingham, Indian linon, knit goods, lingerie checks, longcloth, madras, muslin, nainsook, net and lace, Oxford, pajama checks, pin checks, poplin, pongee, swiss, tape, voile. Men's: Airplane fabric, balbriggan, batiste, broadcloth, dimity, flannelette, knit goods, longcloth, madras, muslin, nainsook, Oxford, print cloth, seersucker, sheeting.

UNIFORMS, MILITARY: Butcher's linen, chino, dungaree, duck, gabardine, khaki cloth.

UPHOLSTERY: Filler: Batting and wadding, felt, linters, waste. Trimmings: Braid, lace, embroideries, twine, webbing. Covering: Armure, Bedford cord, brocade, broadcloth, cambric, charmeuse, Cheviot, cretonne, corduroy, crinoline, damask, denim, drill, duck, haircloth, imitation leather, Jacquard fabric, moleskin, momie cloth, muslin, print cloth, Osnaburg, plush, rep, tapestry, sateen, sheeting, velveteen, Venetian.

Slip Covers: Alpaca, awning stripes, cambric, chambray, crash, cretonne, chintz, denim, drill, duck, gingham, Indian linen, muslin, sateen, sheeting.

UPPERS FOR SHOES: Brocade, drill, duck, print cloth, sateen, cotton-backed satin, terry cloth, cotton-back velvet, velveteen.

VALVE PADS FOR TIRES: Square-woven fabric.

VENTILATORS FOR SCREENS: Cheesecloth, duck for air ducts, print cloth, scrim, sheeting.

WALL COVERINGS NOT DRAPERIES: Armure, brocade, cotton burlap, cheesecloth, damask, duck, momie cloth, muslin, oil-cloth, print cloth, Osnaburg, sheeting, tapestry. Used plain, impregnated, coated with paint, or in combination with other materials.

WASHCLOTHS: Listed under TOWELS.

WATERPROOF FABRICS: Airplane fabric, balloon cloth, denim, drill, duck, gabardine, jean, moleskin, muslin, sateen, serge, sheeting.

WATER WINGS: Rubberized fabric, waterproofed fabric.

WEATHERSTRIPPING: Batting and wadding, felt, sheeting, webbing, yarns for particular use.

WHIPS: Braid, imitation leather, oilcloth, sheeting, webbing.

WINDBREAKS: Duck.

WINDOW SHADES: Cord, duck, fringe, holland, imitation leather, oilcloth, print cloth, sheeting, tape, tobacco cloth, waterproof fabric.

WINDSHIELDS FOR MOTOR CYCLES: Duck, khaki cloth.

WORK CLOTHES, MEN'S: Bedford cord, corduroy, crash, denim, drill, duck, dungaree, jean, jersey cloth, Oxford, rep, sheeting, swansdown, ticking.

How to Use This Text

Index Reference

85. Assuming you have studied this text, prepare your examination and mail it. Then begin studying the next assignment, which will discuss woolen and synthetic fabrics. Today many fabrics originally made of wool are made of cotton or synthetics. Therefore, if a certain cotton fabric wasn't explained in this text, undoubtedly you will find it covered in the next one. Also, fabrics made from novelty yarns have not been mentioned. All common fabric constructions can be varied by the use of novelty yarns. These variations are covered in another text.

At the beginning of this text you probably have noticed that there is an index. You'll find the index very helpful when using this text for reference. You can't possibly retain everything you study, but with the help of the index you should be able to find what you want when you want it. The two texts on standard textile fabrics are designed to give you the answers to any questions that normally arise concerning the names, constructions, and properties of standard fabrics.

Standard Textile Fabrics

Serial 5882A-1

PART 1

Edition 2

Examination Questions

Notice to Students.—Study this instruction text thoroughly before you answer the following questions. Read each question carefully and be sure you understand it; then write the best answer you can. You will profit most if you answer the questions in your own words. When you complete your work, examine it closely, correct all the errors you can find, and see that every question is answered; then mail your work to us. DO NOT HOLD IT until another examination is ready.

1. Select ten different cotton fabrics that are suitable for ladies' summer dresses. Write down the name of each fabric you have selected, and after each name state which properties make the particular fabric suitable for dress use. Also state, in each case, whether you think the fabric is suitable for high-priced, medium-priced, or low-priced garments. (50%)
2. Work fabrics are sturdy but usually not very pretty. Name two such fabrics that have been adapted for fashionable sport and leisure wear. Explain what changes had to be made in the fabrics to make them suitable for new purpose. (10%)
3. Suppose you find yourself in a strange town, and you are out of clean shirts. You go to a store to buy some shirts, but you know that you can't return them, because you must move on. You have no time to inquire about the reliability of the store, yet you want to be sure that your shirts will not shrink when you wash them and that the color will not bleed. What can you do to assure yourself that the shirts you buy are of the desired quality? (10%)

4. In trade magazines, in advertisements, and even in the newspapers, you read a lot about the resin-type and silicone finishes that are applied to cotton goods. What is the major purpose of each of these finishes? (10%)
5. Explain, in your own words, what is meant by each of the following expressions: *a*) 80×50; *b*) double-loop bath toweling; *c*) flat duck; and *d*) resist-printed. (20%)